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ABSTRACT

This curriculum guide was designed for use in postsecondary auto mechanics education programs in Georgia. Its intent is to develop entry level skills in the areas of knowledge, theoretical structure, tool usage, diagnostic ability, related supportive skills, and occupational survival skills. The first two sections of the guide explain the philosophy, goals, purpose, and objectives of the state and local programs of vocational education, and those of the guide itself. In section 3, the occupational field of auto mechanics is described; and employability skills, student exit points, and tasks cross referenced to the Dictionary of Occupational Titles are listed. The curriculum structure and course outline are provided in section 4, which includes policy guidelines for "live" auto repair shop work and a suggested amount of time for each educational unit. Section 5, the main part of the guide, provides unit guides for each task to be taught in the curriculum. (For each task, a description of the task to be taught, a student performance objective, suggested instructional activities, lists of instructional materials, evaluation sections, suggested classroom hours, and related instruction tasks are included.) Section 6 contains lists of references and resources needed to conduct the course, while student record forms comprise section 7. Following suggestions for working with special needs students (section 8), the curriculum guide concludes with a facility layout for a learning resource center and a laboratory resource center, and definitions of terms (sections 9 and 10). (KC)

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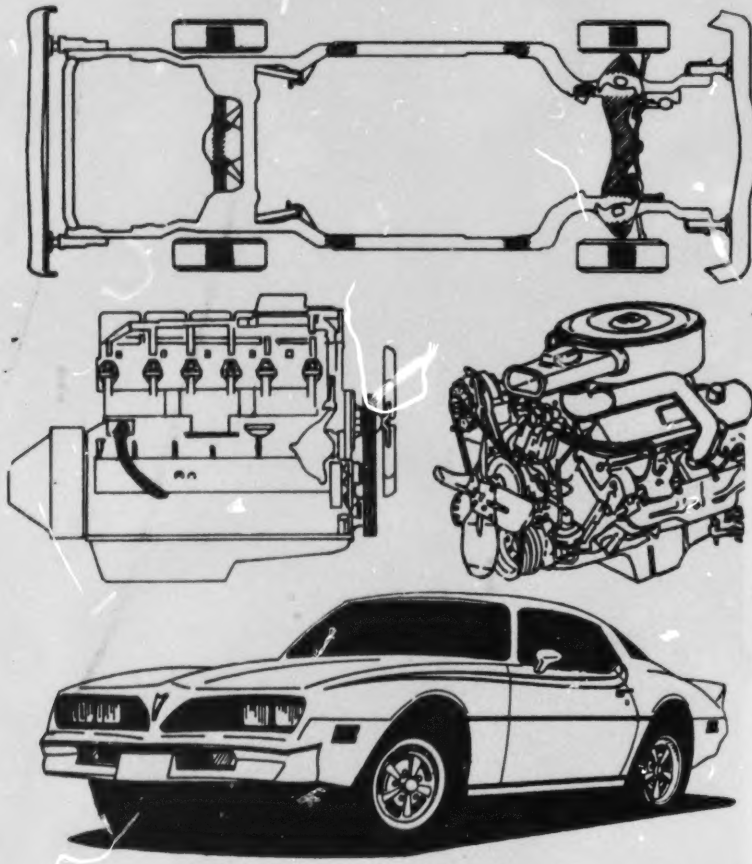
AUTO MECHANICS

Post Secondary



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CURRICULUM GUIDE

Georgia Department of Education

AUTO MECHANICS

Developed Under Contractual Agreement with

Division of Program Development
Office of Vocational Education
Georgia Department of Education
Atlanta, Georgia 30334
Charles McDaniel, State Superintendent of Schools
1981

AUTO MECHANICS

Developed By
The University of Georgia

Under the Direction of
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POLICIES AND PROCEDURES FOR THE CENTER

PURPOSE OF THE CENTER

The Vocational Education Materials Center functions within the Division of Vocational Education, University of Georgia. This Center operates under grants from the U.S. Office of Education, and the Georgia State Department of Education with the support of the College of Education. The Center is comprehensive in its commitment and approach to the development and dissemination of materials in the broad field of Vocational Education.

The purpose of the Center is to increase the capability of Georgia's delivery system for Vocational Education. Specifically, the Center is committed to:

1. Develop materials to assist in the implementation of proposed curricula and to enhance the teaching of Vocational Education.
2. Conduct and report curriculum research related to Vocational Education.
3. Provide a production and dissemination center for Vocational Education materials.
4. Provide direct experiences in curriculum development and diffusion for advanced graduate students.
5. Enable faculty members to participate in the development and implementation of a variety of curriculum materials.

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SECTION I

PHILOSOPHY & GOALS

VOCATIONAL EDUCATION IN GEORGIA

A. PHILOSOPHY

The Georgia Board of Education perceives vocational education as a vital component in the education of the young and adult citizens of this State. Appropriate programs of vocational education and ancillary services should be made readily available to individuals in middle schools, high schools, postsecondary area vocational-technical schools, vocational divisions of junior colleges, vocational centers, the Quick Start program and other adult programs designed to train or retrain workers for useful and satisfying employment.

Special services and assistance must be provided to those who need it in order to participate or benefit from vocational education. This includes women, minorities, the displaced homemaker and other displaced workers, those with limited English-speaking ability, the disadvantaged and the handicapped.

Since men and women spend the greater part of their lives at some form of work, the State should provide opportunities for all its citizens to develop the knowledge, skills and attitudes necessary for them to secure personally satisfying and socially useful employment.

B. PURPOSE

The purpose of vocational education shall be to improve the economic well-being of Georgia citizens by preparing individuals, through organized learning experiences, to select, obtain and advance in recognized occupations.

POSTSECONDARY VOCATIONAL EDUCATION

A. PURPOSE

The purpose of postsecondary vocational-technical education in Georgia is to improve the economic well-being of adult citizens by providing access to high quality vocational-technical training for skilled and semi-skilled occupations, for improvement of existing skills or for retraining in a new occupation.

B. OBJECTIVES

1. To provide vocational-technical education programs and ancillary services commensurate with the needs and interests of students and available job opportunities.

2. To provide vocational-technical education programs which are current with the state-of-the-art, competency-based, and offer multiple exit points to accomodate the students' occupational objectives.

3. To provide vocational-technical education programs which are articulated with available high school counterparts, to facilitate an easy transition from secondary to postsecondary levels without loss of credit.

4. To provide vocational-technical education programs such that 75% of those individuals who leave or complete a program of occupational preparation will find employment in the field, or a related field, for which trained.

5. To provide those guidance, counseling, financial aid, evaluative, job placement, remedial and other supportive programs and services needed by students to enroll, complete a program and become, or remain, employable in a skilled or semi-skilled occupation.

6. To provide needed assistance to special populations to include women, minorities, limited English-speaking, the displaced homemaker and other displaced workers, the disadvantaged and the handicapped.

7. To provide vocational-technical education programs for full-time and part-time students on campus during the day as well as the evening hours, and to provide appropriate programs for full-time and part-time students off campus in businesses and industries, comprehensive high schools and other locations within the respective schools' service areas.

8. To serve as a center for the delivery of postsecondary and adult vocational-technical education programs and services for the community and assigned service area.

STATEMENT OF LOCAL SYSTEM PHILOSOPHY, PURPOSE AND GOALS FOR VOCATIONAL EDUCATION

SECTION II

PURPOSE & OBJECTIVES

PURPOSE OF GUIDE

The purpose is defined in terms of the functional needs of each of the identified classes of users in the secondary and post secondary systems.

(a) Vocational teachers.

1. Provide a guide for organizing their program of instruction,
2. Assist in establishing program objectives,
3. Serve as a curriculum materials resource guide,
4. Improve communications with employers and advisory committees,
5. Facilitate competency based instruction,
6. Facilitate either group or self-paced instruction,
7. Include content by quarter and semester, .
8. Cross-reference with existing state developed instructional materials (PLACE packages and post secondary I.I.).

(b) Vocational supervisors and administrators.

1. Assist in defining the scope and content of their programs,
2. Provide a means to improve curriculum management functions,
3. Serve as a guide for admissions and job placement functions,
4. Improve communications with employers and advisory committees.

(c) Counseling and guidance staff.

1. Provide a data base for counseling and guidance personnel,
2. Identify student exit points (Carrer Options),
3. Serve as guide for admissions and job placement,
4. Correlate with the new State Board of Education graduation requirements,
5. Provide specific content sequencing by quarter and semester for student scheduling,
6. Provide (a) curriculum options for the disadvantaged handicapped student, (b) curriculum modifications for SPECIAL NEEDS students, (c) typical admission requirements for regular and SPECIAL NEEDS students.

(d) Local Curriculum Coordination Committees.

1. Serve as a guide in working out articulation arrangements,
2. Improve definitions of the relationship between secondary clusters and post secondary specialized programs.

This guide will serve as an ideal communication device between school personnel and the craft advisory committee. By personally reviewing the guide with the local craft advisory committee the teacher will be able to maintain the accuracy of the guide in terms of the local job market and will also be able to inform representatives of local industry regarding the content of the program itself.

AUTO MECHANICS PROGRAM OBJECTIVES

Given appropriate instruction, as suggested by this guide, a student completing the program should demonstrate entry level skills in Auto Mechanics in the areas of knowledge, theoretical structure, tool usage, diagnostic ability, related supportive skills and occupational survival skills.

As the student progresses through the program, sufficient competencies will be acquired to enable the student to enter the occupational field at the following curriculum exit points.

Service Station Attendant	(D.O.T. Code 915.467-010)
Auto Mechanic Helper	(D.O.T. Code 620.684-014)
Brake Mechanic	(D.O.T. Code 620.281-026)
Front End Mechanic	(D.O.T. Code 620.281-038)
Carburetor Mechanic	(D.O.T. Code 620.281-034)
Tune-up Mechanic	(D.O.T. Code 620.281-066)
Auto Mechanic	(D.O.T. Code 620.261-010)
Diesel Mechanic Helper	(D.O.T. Code 625-684-010)
Transmission Mechanic	(D.O.T. Code 620.281-062)

SECTION III

D. O. T. DESCRIPTION, EXIT POINTS, TASKS

DESCRIPTION OF OCCUPATIONAL FIELD

The primary purpose of this section is to provide a general orientation to the occupational field. This orientation may be used by counseling and guidance staff in helping students to select subject areas. It may also be used by instructors for new students just entering the program area. The description delimits the scope of the occupational field in terms of the range of activities involved in a series of occupations. It contains information about career potential within the occupational field, including job market conditions and trends.

The description identifies prerequisite skills and knowledge for those students interested in entering the occupational field. In addition, the Description of Occupational Exit Points are provided to aide the instructor in identifying possible jobs for early leavers. A listing of employability skills is also included in this section.

AUTO MECHANICS

Nature of the Work

Anyone whose car has broken down knows how important the automobile mechanic's job is. The ability to make a quick and accurate diagnosis, one of the mechanic's most valuable skills, requires good reasoning ability and a thorough knowledge of automobiles. In fact, many mechanics consider diagnosing "hard to find" troubles one of their most challenging and satisfying duties.

When mechanical or electrical troubles occur, mechanics first get a description of the symptoms from the owner or, if they work in a dealership, the service advisor who wrote the repair order. The mechanic may have to test drive the car or use testing equipment, such as motor analyzers, spark plug testers, or compression gauges, to locate the problem. Once the cause of the problem is found, mechanics make adjustments or repairs. If a part cannot be fixed, they replace it.

Most automobile mechanics perform a variety of repairs; others specialize. Automobile mechanics who specialize require considerable experience and training.

To prevent breakdowns, most car owners have their cars checked regularly and parts adjusted, repaired, or replaced before they go bad. This responsibility of the mechanic is vital to safe and trouble-free driving. When doing preventive maintenance, mechanics may follow a checklist to be sure they examine all important parts. The list may include distributor points, spark plugs, and other potentially troublesome items.

Working Conditions

Generally, mechanics work indoors. Modern automobile repair shops are well ventilated, lighted, and heated, but older shops may not have these advantages. Mechanics frequently work with dirty and greasy parts, and in awkward positions. Many of the automobile parts and tools that they must lift are heavy. Minor cuts and bruises are common, but serious accidents can be avoided by keeping the shop clean and orderly and observing other safety practices.

Places of Employment

More than 860,000 persons worked as automobile mechanics in 1978. Most worked for automobile dealers, automobile repair shops, gasoline service stations, and department stores that have automobile service facilities. Others were employed by Federal, State, and local governments, taxicab and automobile leasing companies, and other organizations that repair their own automobiles. Some mechanics employed by automobile manufacturers make final adjustments and repairs at the end of the assembly line.

Most automobile mechanics work in shops that employ from one to five mechanics, but some of the largest shops employ more than 100. Generally, automobile dealer shops employ more mechanics than independent shops.

Automobile mechanics work in every section of the country. Geographically, employment is distributed about the same as population.

Training, Other Qualifications, and Advancement

Most automobile mechanics learn the trade on the job. Beginners usually start as helpers, lubrication workers, or gasoline station attendants, and gradually acquire skills by working with experienced mechanics. Although a beginner can make simple repairs after a few months' experience, it usually takes 3 to 4 years to become familiar with all types of repairs. An additional year or two is necessary to learn a difficult specialty, such as automatic transmission repair. In contrast, radiator mechanics, glass mechanics, and brake specialists, who do not need an all-round knowledge of automobile repair, may learn their jobs in about 2 years.

Most training authorities recommend a 3- or 4-year formal apprenticeship program. Apprenticeship programs are offered through many auto dealers and independent repair shops. These programs include both on-the-job training and classroom instruction. On-the-job training includes instruction in basic service procedures, such as engine tune-up, as well as instruction in special procedures such as overhauling transmissions. Classroom instruction includes courses in related theory such as mathematics and physics and other areas such as shop safety and customer relations.

For entry jobs, employers look for young persons with mechanical aptitude and a knowledge of automobiles. Generally, a driver's license is required as mechanics occasionally have to test drive or deliver cars. Working on cars in the Armed Forces or as a hobby is valuable experience. Completion of high school is an advantage in obtaining an entry job because to most employers graduation indicates that a young person has at least some of the traits of a good worker, such as perseverance and the ability to learn, and has potential for advancement. Courses in physical science and mathematics can help a person better understand how an automobile operates.

Employers sometimes send experienced mechanics to factory training centers to learn to repair new models or to receive special training in automatic transmission or air conditioning repair. Manufacturers also send representatives to local shops to conduct short training sessions. Automobile dealers may select promising beginners to attend factory-sponsored mechanic training programs.

Experienced mechanics who have leadership ability may advance to shop supervisor or service manager. Mechanics who like to work with customers may become service advisors. Many mechanics open their own repair shops or gasoline service stations and about 1 out of 7 automobile mechanics is self-employed.

Employment Outlook

Job opportunities for automobile mechanics will be plentiful in the years ahead. Replacement needs are high in this large occupation. Thus, in addition to openings created by the growing need for these workers, thousands of jobs will arise each year as experienced mechanics retire, die, or change jobs.

Employment of automobile mechanics is expected to increase about as fast as the average for all occupations through the 1980's. The number of mechanics is expected to increase because expansion of the driving age population and consumer purchasing power will increase the number of automobiles on the road.

Employment also is expected to grow because a greater number of automobiles will be equipped with pollution control and safety devices, air-conditioning, and other features that increase maintenance requirements.

Most persons who enter the occupation may expect steady work because the automobile repair business is not much affected by changes in economic conditions.

Sources of Additional Information

For more details about work opportunities, contact local employers such as automobile dealers and repair shops; locals of the unions previously mentioned; or the local office of the State employment service. The State employment service also may have information about apprenticeship and other training programs.

For general information about the work of automobile mechanics, and apprenticeship training, write to:

Automobile Service Industry Association
444 North Michigan Avenue
Chicago, Illinois 60611

Automotive Service Councils, Inc.
188 Industrial Drive
Suite 112
Elmhurst, Illinois 60126

National Automobile Dealers Association
8400 Westpark Drive
McLean, Virginia 22102

Description of Occupational Exit Points*

620.261-010 AUTOMOBILE MECHANIC (auto ser.) garage mechanic.

Repairs and overhauls automobiles, buses, trucks, and other automotive vehicles: Examines vehicle and discusses with customer or AUTOMOBILE REPAIR SERVICE ESTIMATOR (auto. ser.); AUTOMOBILE TESTER (auto. ser.); or BUS INSPECTOR (auto. ser.) nature and extent of damage or malfunction. Plans work procedure, using charts, technical manuals, and experience. Raises vehicle, using hydraulic jack or hoist, to gain access to mechanical units bolted to underside of vehicle. Removes unit, such as engine, transmission, or differential, using wrenches and hoist. Disassembles unit and inspects parts for wear, parts, such as pistons, rods, gears, valves, and bearings, using mechanic's handtools. Overhauls or replaces carburetors, blowers, generators, distruburtors, starters, and pumps. Rebuilds parts, such as crankshafts and cylinder blocks, using lathes, shapers, drill presses, and welding equipment. Rewires ignition system, lights, and instrument panel. Relines and adjusts brakes, alines front end, repairs or replaces shock absorbers, and solders leaks in radiator. Mends damaged body and fenders by hammering out or filling in dents and welding broken parts. Replaces and adjusts radios, heaters, mirrors, and windshield wipers. May be designated according to specialty as AUTOMOBILE MECHANIC MOTOR (auto. ser.); BUS MECHANIC (auto. ser.); DIFFERENTIAL REPAIRER (auto. ser.); ENGINE REPAIR MECHANIC, BUS (auto. ser.); FOREIGN CAR MECHANIC (auto. ser.); TRUCK MECHANIC (auto. ser.). When working in service station may be designated AUTOMOBILE SERVICE STATION MECHANIC (auto. ser.).

620.684-014 AUTOMOBILE MECHANIC HELPTER (auto. ser.) automobile mechanic assistant; mechanic helper.

Assists AUTOMOBILE MECHANIC (auto. ser.) in repairing automobiles, buses, trucks, and other automotive vehicles: Raises vehicle to specified level, using hydraulic jack. Removes and disassembles unit, such as engine, transmission, or differential, to be repaired, using handtools and power tools. Cleans unit, using prescribed solvent. Lubricates and washes vehicle. Performs other duties as described under HELPER (any ind.). May be designated according to specialty of worker assisted as TRUCK MECHANIC HELPTER (auto. ser.).

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* From D.O.T.

620.281-066 TUNE UP MECHANIC (auto. ser.)

Tunes automotive vehicle engines to insure efficient operation: Removes spark plugs, using socket wrench, and tests them, using sparkplug tester. Cleans electrodes in sandblasting machine, sets spark gap with feeler gage, and replaces or installs new plugs. Inspects distrubutor breaker points for wear and pits, using feeler gage, and replaces or resets points. Observes ignition timing, using timing light, and adjusts timing, using handtools. Adjusts carburetor needle setting, using handtools, and verifies adjustment, using instruments, such as fuel analyzer, vacuum gage, oscilloscope, and tachometer. Sets valve tappets, using feeler gage or dial indicator. Replaces defective coils, condensers, and pump. Examines battery and connections and electrical charging and starting circuit. Adjusts, and repairs fan belt, and fuel and water pumps. May tune engine while vehicle runs on rollers connected to dynamometer and be designated as DYNAMOMETER TUNER (auto. ser.).

620.281-038 FRONT END MECHANIC (auto. ser.) alinement mechanic; axle and frame mechanic; chassis mechanic; wheel alinement mechanic.

Alines wheels, axles, frames, torsion bars, and steering mechanisms of automotive vehicles, such as automobiles, buses, and trucks: Drives automotive vehicle onto wheel alinement rack and tests vehicle for faulty wheel alinement, bent axle, worn ball joints, and bent steering rods, using alinement testing machine. Straightens axle and steering rods and adjusts shims, tie rods, and joining pins to aline wheels, or installs new parts, using handtools. Places wheel on balancing machine to determine where counterweights must be added to balance wheel. Hammers counterweights onto rim of wheel. Installs shock absorbers. Straightens frame, using hydraulic jack, chassis aliner, and acetylene torch.

620.281-026 BRAKE REPAIRER (auto. ser.) brake mechanic; brake repair mechanic, brakeshoe repairer.

Repairs and overhauls brake systems in automobiles, buses, trucks, and other automotive vehicles: Pushes handle of hydraulic jack or pushes hoist control to raise vehicle axle. Removes wheels, using brakeshoe units or attaches new linings to brakeshoes. Measures brakedrum to determine amount of wear, using feeler gage. Inserts vacuum gage into power-brake cylinder, starts engine, and reads gage to detect brake-line leaks. Repairs or replaces leaky brake cylinders. Repairs or replaces defective air compressor in airbrake systems. Replaces wheel on axle and adjusts drumshoe clearance, using wrench. Fills master brake cylinder with brake fluid, pumps brake pedal, or uses pressure tank, and opens valves on hydraulic brake system to bleed air from brake lines. Closes valves and refills master brake cylinder. May be designated according to specialty as BRAKE REPAIRER, AIR (auto. ser.); BRAKE REPAIRER, HYDRAULIC (auto. ser.); BRAKE REPAIRER, BUS (auto. ser.).

620.281-034 CARBURETOR MECHANIC (auto. ser.) carburetor repairer.

Repairs and adjusts motor vehicle carburetors: Disassembles carburetors and gasoline filter units, using handtools. Examines parts for defects and tests needle valves with wire gages and flowmeter. Cleans parts in solvents to remove dirt and gum deposits. Repairs or replaces defective parts. Reassembles carburetor and gasoline filter, and installs them in vehicle. Starts engine and turns adjustment screw to regulate flow of air and gasoline through carburetor, using testing equipment. May operate drill press, lathe, and other power tools to retap jets, ream throttle bodies and chokes, and machine seating surfaces of carburetor housings. May install and repair mechanical devices that convert conventional systems to use of other fuels [VEHICLE FUEL SYSTEMS CONVERTER (auto. ser.).

620.281-062 TRANSMISSION MECHANIC (auto. ser.)

Repairs manual and automatic transmissions in automobiles, buses, trucks, and other automotive vehicles: Raises automotive vehicle, using jacks or hoists, and removes transmission, using mechanic's handtools. Disassembles transmission unit and replaces broken or worn parts, such as, bands, gears, seals, and valves. Adjusts pumps, bands, and gears as required, using wrenches. Installs repaired transmission and fills it with specified fluid. Adjusts operating linkage and tests operation on road. May adjust carburetor. May verify idle speed of motor, using equipment, such as tachometer, making required adjustments. May specialize in repair automatic transmissions and be designated as AUTOMATIC TRANSMISSION MECHANIC (auto. ser.).

915.467-010 AUTOMOBILE-SERVICE-STATION ATTENDANT
(auto. ser.) filling-station attendant:
gas tender; service-station attendant.

Services automobiles, buses, trucks, and other automotive vehicles with fuel, lubricants, and accessories: Fills fuel tank of vehicles with gasoline or diesel fuel to level specified by customer. Observes level of amounts of oil and crankcase and amount of water in radiator, and adds required amounts of oil and water. Adds necessary amount of water to battery, and washes windshield of vehicle. Lubricates vehicle and changes motor oil [LUBRICATION SERVICER (auto. ser.)] Replaces accessories, such as oil filter, air filter, windshield wiper blades, and fan belt. Installs antifreeze and changes spark plugs. Repairs or replaces tires [TIRE REPAIRER (auto. ser.)] Replaces lights, and washes and waxes vehicle. Collects cash from customer for purchases and makes change or charges purchases, using customer-charge plate. May adjust brakes [BRAKE ADJUSTER (auto. ser.)] May sell batteries and automobile accessories usually found in service stations. May assist in arranging displays, taking inventories, and making daily reports.

625.684-010 DIESEL MECHANIC HELPER (any ind.)

Assists DIESEL MECHANIC (any ind.) in overhauling and maintaining diesel motors used to operate trucks, generators, and other equipment: Disassembles motor and cleans parts. Obtains parts from stock and hands tools to mechanic. Assists in reassembly, and cleans tools and working area. Performs other duties as described under HELPER (any ind.).

EMPLOYABILITY SKILLS

In addition to the aptitudes, abilities, interests, physical requirements and job skills listed in the preceding Description of Occupation, employability skills exert a great deal of influence on a person's ability to get and keep a job. Surveys indicate that more people lose their jobs because of poor attitudes toward their job than for lack of job skills. For this reason it is important that information concerning the following employability skills be provided as an ongoing part of the program.

1. Getting a job
    a. Filling out job applications
    b. Developing a resume
    c. Preparing for a job interview
2. Keeping a job
    a. Be on time and regular in attendance
    b. Maintain a fair share of the work-load
    c. Work without supervision
    d. Meet production schedules
    e. Properly care for and use equipment
    f. Dress appropriately for the job
    g. Maintain good personal hygiene
    h. Develop and maintain good communication with supervisors and co-workers

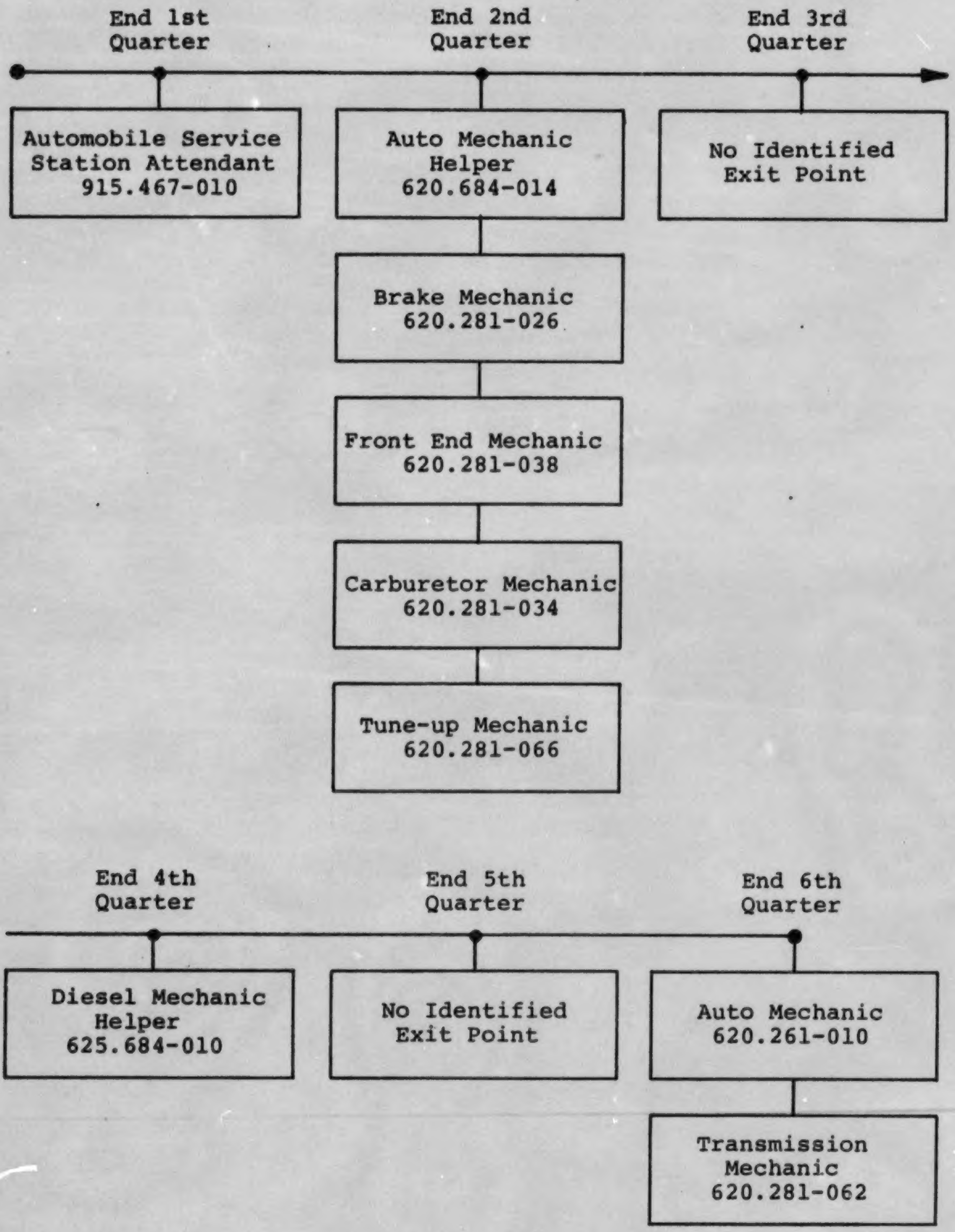
AUTO MECHANIC EXIT POINTS

The diagram on the following page is based on the Suggested Course Outline Structure. It graphically illustrates the points in the Auto Mechanics program where the student should have acquired the competencies necessary for entry level employment into the job classifications indicated. In many cases by the time a student reaches an exit point he/she may have acquired several competencies in addition to those required for the specific job classification.

The course outline is structured to prepare students to become Service Station Attendants, Auto Mechanic Helpers, Brake Mechanics, Front-end Mechanics, Carburetor Mechanics, Tune-up Mechanics, Automotive Diesel Mechanic Helpers, Auto Mechanics and Tramsmission Mechanics. Every student, upon leaving the program, should have entry level skills in some related occupation.

The Task Listing by DOT Code indicates the entry level skills (tasks) required for the student to be considered employable in a specified occupation. If the local program is individualized it should be relatively easy to move a potential program leaver (drop out) into those skills (tasks) which could qualify the student for one of the listed occupations.

AUTO MECHANICS EXIT POINTS


End 1st Quarter
End 2nd Quarter
End 3rd Quarter
Automobile Service Station Attendant 915.467-010
Auto Mechanic Helper 620.684-014
No Identified Exit Point
Brake Mechanic 620.281-026
Front End Mechanic 620.281-038
Carburetor Mechanic 620.281-034
Tune-up Mechanic 620.281-066
End 4th Quarter
End 5th Quarter
End 6th Quarter
Diesel Mechanic Helper 625.684-010
No Identified Exit Point
Auto Mechanic 620.261-010
Transmission Mechanic 620.281-062

TASK LISTING BY D.O.T. CODE

The tasks are listed in this section in a matrix format that cross references them with the applicable D.O.T. Codes for the exit point occupational titles. Each task is identified with one or more of the exit point occupational titles. This information may be used to make a specific determination as to when a student has developed the necessary skills to qualify for an exit point and is particularly useful in preparing early leavers to meet the requirements for a specific occupational title. Both secondary and post secondary tasks are listed with the secondary tasks identified by an asterisk.

TASK LISTING BY DOT CODE

OCCUPATIONAL AREA (POST SECONDARY)
Auto Mechanics

RELATED SECONDARY CLUSTER
Transportation

*DENOTES SECONDARY EXPECTANCY

	POSSIBLE EXIT POINTS									
	DOT DESCRIPTION	Auto Mechanic	Auto Mechanic Helper	Tune-up Mechanic	Front-end Mechanic	Brake Mechanic	Carburetor Mechanic	Transmission Mechanic	Automobile Service Station Attendant	Diesel Mechanic Helper
	DOT NO.	620.261-010	620.684-014	620.281-066	620.281-038	620.281-026	620.281-034	620.281-062	915.467-010	625.684-010
TASK NO.	TASK NAME									
	DUTY A Related Instruction									
*RI-01	Demonstrating and utilizing school and shop policies and procedures	X	X	X	X	X	X	X	X	X
*RI-02	Maintaining a parts inventory	X	X	X	X	X	X	X	X	X
*RI-03	Reading and interpreting the shop service manuals	X	X	X	X	X	X	X	X	X
*RI-04	Completing job work order forms	X	X	X	X	X	X	X	X	X
*RI-05	Identifying and maintaining shop tools and equipment	X	X	X	X	X	X	X	X	X
*RI-06	Using precision measurement tools and equipment	X	X	X	X	X	X	X	X	X
*RI-07	Demonstrating engine theories of operation	X	X	X	X	X	X	X	X	X
*RI-08	Demonstrating a knowledge of electricity fundamentals	X	X	X	X	X	X	X	X	X
*RI-09	Demonstrating a knowledge of fuels	X	X	X	X	X	X	X	X	X
*RI-10	Demonstrating a knowledge of lubricants								X	
*RI-11	Demonstrating a knowledge of hardware and fasteners	X	X	X	X	X	X	X	X	X
*RI-12	Demonstrating basic metal operations	X			X	X				

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	DOT NO.	620.261-010	620.684-014	620.281-066	620.281-038	620.281-026	620.281-034	620.281-062	915.467-010	625.684-010
*RI-13	Demonstrating welding and soldering techniques	X	X	X	X	X	X	X	X	X
*RI-14	Demonstrating a knowledge of applied mathematics	X	X	X	X	X	X	X	X	X
*RI-15	Demonstrating a knowledge of applied science	X	X	X	X	X	X	X	X	X
AUTOMOTIVE SYSTEMS REPAIR										
	DUTY I - Perform service checks									
*AS-01	Checking and changing engine oil and oil filter	X	X						X	X
*AS-02	Checking fluid level and refilling transmission and rear end	X	X					X	X	X
*AS-03	Lubricating chassis and components	X	X	X	X	X	X	X	X	X
*AS-04	Checking and replacing windshield wiper blades	X	X						X	X
*AS-05	Repairing tires and tubes	X	X		X				X	X
*AS-06	Replacing light bulbs and fuses	X	X	X	X	X	X		X	X
*AS-07	Washing and waxing vehicle	X	X						X	X
*AS-08	Performing state inspection	X	X	X	X	X	X	X	X	X

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	DOT NO.	620.261-010	620.684-014	620.281-066	620.281-038	620.281-026	620.281-034	620.281-062	915.467-010	625.684-010
TASK NO.	TASK NAME									
	DUTY II - Service, maintain and repair the fuel system									
*AS-09	Adjusting fuel/air mixtures and mechanical linkage	X	X	X			X	X	X	
*AS-10	Cleaning or replacing fuel and air filters	X	X	X			X	X	X	X
*AS-11	Removing carburetor from engine	X	X	X			X			
*AS-12	Disassembling, cleaning and inspecting carburetor	X		X			X			
*AS-13	Reassembling and testing carburetor	X		X			X			
*AS-14	Testing and replacing fuel pump	X		X			X			
*AS-15	Servicing fuel tank, lines, hoses and fuel level monitoring devices	X		X			X		X	
*AS-16	Diagnosing fuel system problems	X		X			X		X	
	DUTY III - Service, maintain and repair the ignition system									
*AS-17	Inspecting, selecting and installing spark plugs	X	X	X					X	

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*AS-18	Timing the ignition		X	X	X			X		X	
*AS-19	Inspecting and replacing circuit wiring, distributor cap and rotor		X	X	X			X		X	
*AS-20	Testing, removing and replacing battery ignition components		X	X	X			X		X	
*AS-21	Testing, removing and replacing electronic ignition components		X		X			X			
*AS-22	Using and interpreting the ignition analyzer		X		X			X			
*AS-23	Diagnosing ignition system problems		X		X			X		X	
	DUTY IV - Service, maintain and repair the starting system										
*AS-24	Servicing battery and cables		X	X	X		X			X	X
*AS-25	Replacing and rebuilding solenoids and switches		X		X					X	
*AS-26	Removing and replacing the starter		X	X	X				X	X	X
*AS-27	Disassembling and inspecting the starter components		X		X					X	X
*AS-28	Reconditioning the starter components		X		X						
*AS-29	Reassembling and testing the starter		X		X					X	X

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*AS-30	Diagnosing starting system problems	X		X					X	
	DUTY V - Service, maintain and repair the charging system									
*AS-31	Testing the DC generator and regulator	X		X					X	
*AS-32	Testing the alternator and regulator	X		X						
*AS-33	Removing, disassembling and inspecting the generator	X		X						
*AS-34	Rebuilding the generator	X		X						
*AS-35	Removing, disassembling and inspecting the alternator	X		X						
*AS-36	Rebuilding the alternator	X		X						
*AS-37	Removing and replacing generators and alternators	X	X	X	X	X	X		X	X
*AS-38	Diagnosing charging system problems	X		X						
	DUTY VI - Service, maintain and repair the heating and cooling system									
*AS-39	Checking coolant level and freezing point	X	X	X			X		X	X

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*AS-40	Cleaning and flushing the system	X	X	X					X	X
*AS-41	Inspecting, adjusting or replacing fan belts and hoses	X	X	X			X	X	X	X
*AS-42	Testing system with pressure	X	X	X					X	X
*AS-43	Removing, repairing and replacing the radiator	X	X	X				X	X	X
*AS-44	Testing and replacing thermostats and radiator caps	X	X	X				X	X	X
*AS-45	Replacing the variable speed fan	X	X					X	X	X
*AS-46	Replacing the water pump	X	X	X					X	X
*AS-47	Repairing the heater controls	X		X					X	
*AS-48	Removing, repairing and replacing the heater core	X								
*AS-49	Diagnosing cooling system problems	X		X			X		X	
	DUTY VII - Service, maintain and repair the braking system									
*AS-50	Identifying brake system components	X	X		X	X			X	X
*AS-51	Adjusting brakes	X	X		X	X			X	X
*AS-52	Removing and rebuilding brake cylinders	X	X		X	X			X	X

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*AS-53	Removing and rebuilding brake calipers		X			X	X			X	
*AS-54	Replacing brake shoes and pads		X	X		X	X			X	X
*AS-55	Machining brake drums		X	X			X			X	
*AS-56	Machining brake rotors		X	X			X			X	
*AS-57	Replacing hydraulic control valves and lines		X	X			X			X	
*AS-58	Replacing power brake units		X	X			X			X	
*AS-59	Diagnosing brake system problems		X		X	X	X		X		
	DUTY VIII - Service, maintain and repair the suspension system										
*AS-60	Identifying suspension system components		X	X		X	X			X	X
*AS-61	Inspecting suspension system components		X	X		X	X			X	X
*AS-62	Lubricating and adjusting front wheel bearings		X	X		X	X			X	X
*AS-63	Replacing shock absorbers		X	X		X	X			X	X
*AS-64	Replacing front coil springs and rear leaf springs		X	X		X				X	

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*AS-65	Changing and balancing wheels and tires	X	X		X				X	X
*AS-66	Replacing upper and lower control arms and bushings	X	X		X				X	X
*AS-67	Replacing upper and lower ball joints	X	X		X				X	X
*AS-68	Replacing king pins and bushings	X	X		X				X	X
*AS-69	Replacing torsion bars	X			X					
*AS-70	Replacing twin I-beams	X			X					
*AS-71	Diagnosing suspension system problems	X			X					
	DUTY IX - Service, maintain and repair the steering system									
*AS-72	Identifying steering system components	X	X		X	X			X	X
*AS-73	Adjusting manual steering gear	X			X	X				
*AS-74	Inspecting and replacing steering gear linkage	X			X				X	
*AS-75	Replacing power steering unit	X	X		X					X
*AS-76	Replacing steering column	X			X					
*AS-77	Aligning the front-end	X			X					

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TASK NO.	TASK NAME									
*AS-78	Diagnosing steering system problems	X			X	X				
	DUTY X - Service, maintain and repair the emissions control and exhaust systems									
*AS-79	Identifying emissions control components	X	X	X			X		X	X
*AS-80	Measuring exhaust emissions	X		X			X		X	
*AS-81	Testing and replacing components in the positive crankcase ventilation (PCV) system	X	X	X			X		X	
*AS-82	Testing and replacing components in the fuel evaporative control system	X		X			X		X	
*AS-83	Testing and replacing components in the exhaust gas recirculation (EGR) system	X		X			X		X	
*AS-84	Testing and replacing the catalytic converter	X		X			X		X	

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*AS-85	Testing and replacing components in the thermostatic air cleaner system		X		X			X		X	
*AS-86	Testing and replacing components in the air injection reaction (AIR) system		X		X			X		X	
*AS-87	Testing and replacing components in the spark control system		X		X			X		X	
*AS-88	Removing and replacing exhaust pipes, mufflers and tail pipes		X	X						X	X
*AS-89	Diagnosing emissions control and exhaust system problems		X		X			X		X	
AUTOMOTIVE ENGINE OVERHAUL											
	DUTY I - Recondition valves										
*AE-01	Identifying component parts		X	X	X			X		X	X
*AE-02	Performing the cylinder compression and leakage test		X	X	X			X		X	X
*AE-03	Adjusting the valves		X	X	X			X		X	X
*AE-04	Removing the cylinder head(s)		X	X							X
*AE-05	Removing and inspecting the valves and component parts		X	X							X

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*AE-06	Refacing the valves and valve stems	X								
*AE-07	Inspecting the cylinder head	X	X							
*AE-08	Grinding the valve sets	X								
*AE-09	Servicing the rocker arm, push rod and lifter assemblies	X	X							
*AE-10	Reassembling and replacing the cylinder head(s)	X	X							
*AE-11	Diagnosing problems in the valve train	X								
	DUTY II - Replace timing chain and/or gears (engine in vehicle)									
*AE-12	Removing component parts	X	X							X
*AE-13	Removing vibration damper	X	X							X
*AE-14	Removing front cover	X	X							X
*AE-15	Removing and replacing timing chain(s) and/or gears	X	X							X
*AE-16	Replacing front cover and seal	X	X							X
*AE-17	Diagnosing timing chain problems	X	X	X			X			X

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TASK NO.	TASK NAME									
	DUTY III - Install a short block assembly									
*AE-18	Removing engine from vehicle	X	X							X
*AE-19	Removing and inspecting useable parts	X	X							X
*AE-20	Assembling new and used parts on block assembly	X	X							
*AE-21	Installing engine assembly	X	X							X
*AE-22	Testing engine assembly	X								
*AE-23	Diagnosing internal engine failure	X								
	DUTY IV - Rebuild engine block assembly									
*AE-24	Disassembling engine	X	X							X
*AE-25	Cleaning and inspecting block and components	X	X							X
*AE-26	Preparing cylinder block	X	X							X
*AE-27	Installing cam bearings	X								
*AE-28	Installing piston pins and rings	X	X							X
*AE-29	Installing crankshaft	X	X							X
*AE-30	Installing pistons and rod bearings	X	X							X

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*AE-31	Installing oil pump, oil pan and component parts	X								
	DUTY V - Test and repair automotive diesel engines									
*AE-32	Comparing the automotive gas and diesel engines	X	X	X			X			X
*AE-33	Performing the cylinder compression and leakage test	X	X	X						X
*AE-34	Removing and replacing fuel injectors	X								X
*AE-35	Removing and replacing the fuel injection pump	X								X
*AE-36	Removing and replacing the turbo-charger	X								X
*AE-37	Removing the engine from the vehicle	X	X							X
AE-38	Disassembling and inspecting the engine	X	X							X
*AE-39	Rebuilding the diesel engine	X								
*AE-40	Installing the engine	X	X							X
*AE-41	Testing the engine	X								
*AE-42	Diagnosing diesel engine problems	X								

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	DOT DESCRIPTION									
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AUTOMOTIVE ACCESSORIES										
	DUTY I - Test and maintain electrical circuits									
AA-01	Replacing wiring and making splices	X	X	X						
AA-02	Testing and maintaining electrical protection devices	X		X						
AA-03	Testing and repairing the courtesy light circuit	X								
AA-04	Testing and repairing the parking light circuit	X								
AA-05	Testing and repairing the back-up light circuit	X								
AA-06	Testing and repairing the headlight circuit	X								
AA-07	Testing and repairing the turn signal circuit	X								
AA-08	Testing and repairing the brake light circuit	X				X				
AA-09	Testing and repairing the horn circuit	X								
AA-10	Testing and repairing the windshield wiper circuit	X								

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AA-11	Testing and repairing the windshield washer circuits	X								
AA-12	Testing and replacing instrument gauges and sending units	X								
	DUTY II - Test and maintain electrical accessories									
AA-13	Testing and repairing the cruise control unit	X		X						
AA-14	Testing and repairing the automatic alarm system	X								
AA-15	Testing and repairing the C.B. radio power circuit	X								
AA-16	Testing and trimming the radio antenna	X								
AA-17	Testing and repairing power windows and seats	X								
AA-18	Testing and repairing fog lights	X								

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TASK NO.	TASK NAME									
	DUTY III - Test and maintain the air conditioning system									
AA-19	Testing system performance	X								
AA-20	Discharging the system	X	X							
AA-21	Evacuating and charging the system	X								
AA-22	Rebuilding compressors	X								
AA-23	Replacing refrigerant lines and accessories	X	X							
AA-24	Installing air conditioning units	X								
AA-25	Diagnosing air conditioning problems	X								
AUTOMOTIVE POWER TRAINS										
	DUTY I - Service, maintain and repair the manual transmission									
PT-01	Adjusting and repairing clutch and shift linkage	X	X					X		
PT-02	Removing and disassembling transmission	X	X					X		
PT-03	Inspecting and reassembling transmission	X						X		

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PT-04	Removing and replacing clutch assembly		X	X					X		
PT-05	Removing and replacing flywheel ring gear		X	X					X		
PT-06	Diagnosing manual transmission problems		X						X		
	DUTY II - Service, maintain and repair the drive line and rear end										
PT-07	Inspecting drive shaft		X						X	X	
PT-08	Removing and replacing universal joint		X	X					X	X	
PT-09	Removing and replacing constant velocity joints		X						X		
PT-10	Removing and replacing rear axle bearings		X	X							
PT-11	Removing and disassembling differential assembly		X								
PT-12	Inspecting and reassembling differential assembly		X								

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TASK NO.	TASK NAME									
PT-13	Removing and replacing front drive axlé assembly	X								
PT-14	Rebuilding the four wheel drive locking hubs	X								
PT-15	Rebuilding the four wheel drive transfer case	X								
PT-16	Diagnosing drive line and rear end problems	X								
	DUTY III - Service, maintain and repair the automatic transmission									
PT-17	Testing the automatic transmission	X						X		
PT-18	Inspecting and adjusting shift linkage	X						X		
PT-19	Removing and replacing the transmission oil filter	X	X					X		
PT-20	Testing and replacing the vacuum modulator	X						X		
PT-21	Removing and disassembling transmission	X						X		

TASK LISTING BY DOT CODE

OCCUPATIONAL AREA (POST SECONDARY)
Auto Mechanics

RELATED SECONDARY CLUSTER
Transportation

*DENOTES SECONDARY EXPECTANCY

POSSIBLE EXIT POINTS

TASK NO.	TASK NAME	Auto Mechanic	Auto Mechanic Helper	Tune-up Mechanic	Front-end Mechanic	Brake Mechanic	Carburetor Mechanic	Transmission Mechanic	Automobile Service Station Attendant	Diesel Mechanic Helper
	DOT NO.	620.261-010	620.684-014	620.281-066	620.281-038	620.281-026	620.281-034	620.281-062	915.467-010	625.684-010
PT-22	Inspecting and reassembling transmission	X						X		
PT-23	Testing transmission on bench	X						X		
PT-24	Removing and replacing torque converter	X						X		
PT-25	Diagnosing automatic transmission problems	X						X		

SECTION IV

CURRICULUM STRUCTURE & COURSE OUTLINE

CURRICULUM STRUCTURE

The following examples are provided to illustrate two methods in which the post secondary auto mechanics curriculum can be structured. These examples should not imply there are no other ways to structure the curriculum.

Alternative one is based on the curriculum outline and is a block teaching design. Alternative two is also a block design, but the Related Instruction time is included in each duty area. This allows almost immediate hands-on experiences, whereas, alternative one requires 66 hours of classroom teaching before the students receive any laboratory time.

The clock hours listed include instructional time in both the classroom and the laboratory. The additional "live work" laboratory hours are an approximation of the amount of time the student should spend on actual customer repair work. Live work should not be assigned until after successful completion of all the tasks for each quarter.

Live Work Management

It is desirable to conduct an auto mechanic training program in an environment closely resembling that of an actual garage or repair shop. One method used in duplicating real conditions is customer repair work or "live work". Proper management of live work is essential to the success of the program. Often, both school personnel and the general public will exploit programs that take in such projects. This will result in the program becoming a low cost repair shop rather than a training facility. It is the administrator's and instructor's responsibility to establish and enforce a live work policy that will convey to customers the role of the vocational education program.

Live work should be assigned only to those students who have successfully completed all tasks for any given quarter. The live work project should be carefully matched to the student's abilities. Failure to do this will result in the instructor spending a large amount of time as a worker rather than a teacher. Individualized programs are particularly vulnerable to mismanaged customer repair work. The sample live work policy that follows should provide the instructor with some guidelines.

SAMPLE "LIVE WORK" POLICY

POLICIES AND PROCEDURES GOVERNING "LIVE" PRODUCTION JOBS

One of the most meaningful training vehicles is customer repair work or live work requested by a customer and performed by a student. However, such jobs pose serious problems in a public school shop, problems which require rigid regulations as indicated below:

1. Live jobs must provide training for the student. This training can range from skill perfection to developing work habits or customer relation experiences.
2. All materials, parts and supplies used or required in such live work must be paid for by the customer at school cost. Under no circumstances can the school give away public funds or property through this type training. There shall be no cost on labor.
3. All purchases for items needed to do such production jobs must be processed through the school accounts. Under no circumstances should instructors place themselves in a vulnerable position by buying and reselling to customers of the school shop.
4. All monies received from customers must be receipted on an official school receipt and deposited in the school account.
5. All live work must be done by the student. The only time an instructor is to do a live job should be when it is used for demonstration purposes.
6. Under no circumstances shall the instructor or student receive money, rewards, benefits or in any way personally profit from such work, either directly or indirectly. To do so is in direct violation of state law which prohibits the use of public property for personal gain.
7. The following policies concerning the purchase of parts are intended to protect shop teachers from

any possible inference that they, or students, are using public property for personal gain. This can only be done by conducting business through the school's accepted financial and accounting procedures. By doing so, adequate audit is always possible should the need arise.

a. Teachers will be allowed to purchase parts, at school cost, for live work. However, a purchase order must be obtained and given to the vendor when the order is placed.
b. Any items needed for the general operation of the shop programs or for instructional purposes must follow the usual procedure which includes administrative approval prior to ordering.

8. Customer Supplied Parts - For information concerning Customer Supplied Parts, check individual departmental policies.

9. What Work or Jobs May be Accepted

a. Individual instructors may only accept work from technical school staff and students. Other live work is subject to the approval of the Director.
b. All live work must enhance the students' current training activities.

10. How Work or Jobs Will Be Received

Every live production job will be written up on the official school work order form at the time the job is accepted. This work order is to show what instructor accepted the job, the customer's name, address, telephone number, and the nature of the work to be performed.

11. Financial Responsibility

All work is on a cash and carry basis. So far as possible, the customer should be given a fair estimate of his possible expenditure before the work begins. After work has begun and investigation reveals the cost will exceed your estimate by $10 or more, the customer should be consulted and his O.K. obtained before proceeding. By all means, the customer is to understand he must pay all charges due before receiving his goods. Any work delivered without being paid for will become the instructor's liability.

12. Prices to Charge

a. In cases where there are parts and materials used in performing the work, they are to be charged to the customer at school cost.

b. In cases where there are no parts or materials, the instructor should charge the established flat rate to cover incidental items such as rags, solvent, tape, etc. Flat rate will be established annually during September after recommendation by the instructor and approval by the Director.

AUTO MECHANICS CURRICULUM STRUCTURE

(Alternative 1)

Course Number	Course	Clock Hours
	First Quarter	
	Related Instruction: (Safety, Science, Math, Theory, etc.)	66
	Automotive Systems:	
	Service Checks	28
	Fuel Systems	34
	Ignition Systems	40
	Starting Systems	24
	Charging Systems	34
	Additional Live Work	86
		312
	Second Quarter	
	Automotive Systems:	
	Heating/Cooling Systems	42
	Brake Systems	44
	Suspension Systems	60
	Steering Systems	30
	Emission/Exhaust Systems	44
	Additional Live Work	92
		312
	Third Quarter	
	Automotive Engines:	
	Valve Overhaul	56
	Timing Chain Replacement	20
	Short Block Replacement	40
	Gas Engine Overhaul	82
	Additional live work	114
		312
	Fourth Quarter	
	Automotive Engines:	
	Automotive Diesel Engine Overhaul	165
	Additional Live Work	147
		312

Fifth Quarter

Automotive Accessories:	
Electrical Circuits	76
Electrical Accessories	32
Air Conditioning	68
Automotive Power Trains:	
Manual Transmission and Clutch	70
Additional Live Work	66
	312

Sixth Quarter

Automotive Power Trains:	
Drive Line and Rear End	147
Automatic Transmission	87
Additional Live Work	78
	312

AUTO MECHANICS CURRICULUM STRUCTURE

(Alternative 2)

Course Number	Course	Clock Hours
	First Quarter	
	Automotive Systems:	
	Service Checks	56
	Fuel Systems	60
	Ignition Systems	46
	Starting Systems	24
	Charging Systems	34
	Additional Live Work	92
		312
	Second Quarter	
	Automotive Systems:	
	Heating/Cooling Systems	42
	Brake Systems	44
	Suspension Systems	66
	Steering Systems	30
	Emission/Exhaust Systems	44
	Additional Live Work	86
		312
	Third Quarter	
	Automotive Engines:	
	Valve Overhaul	56
	Timing Chain Replacement	20
	Short Block Replacement	40
	Gas Engine Overhaul	82
	Additional Live Work	114
		312
	Fourth Quarter	
	Automotive Engines:	
	Automotive Diesel Engine Overhaul	165
	Additional Live Work	147
		312

Fifth Quarter

Automotive Accessories:	
Electrical Circuits	76
Electrical Accessories	32
Air Conditioning	68
Automotive Power Trains:	
Manual Transmission and Clutch	70
Additional Live Work	66
	312

Sixth Quarter

Automotive Power Trains:	
Drive Line and Rear End	147
Automatic Transmission	87
Additional Live Work	78
	312

COURSE OUTLINE

The following sample quarter system outline is to be used as an example to facilitate the development of alternative outlines for the individual learner. The listing of major blocks within a quarter is not to indicate a sequenced pattern. All duty areas are independent except for the listed prerequisites or related instruction tasks, therefore, a group of students should begin the quarter by learning different tasks. This allows better coordination of the lab hours and the learning objectives may be selected according to the type of "live" projects or equipment available.

The time estimations for completion of the activities are based on opinions of several auto mechanics instructors and published data. The estimates are a minimum amount of time required and should be extended according to the learner's individual needs. The additional laboratory hours is an approximation of the amount of time the student should spend on live work projects. A complete explanation of live work is contained in the curriculum structure introduction.

Auto Machanics Suggested Course Outline

Quarter I

Unit/Task	Title	Classroom & Lab hours:minutes
	Related Instruction	
RI-01	Demonstrating and utilizing school and lab policies and procedures	2:00
RI-02	Maintaining a parts inventory	2:00
RI-03	Reading and interpreting the shop service manuals	2:00
RI-04	Completing job work order forms	2:00
RI-05	Identifying and maintaining shop tools and equipment	10:00
RI-06	Using precision measurement tools and equipment	6:00
RI-07	Demonstrating engine theories of operation	6:00
RI-08	Demonstrating a knowledge of electricity fundamentals	6:00
RI-09	Demonstrating a knowledge of fuels	2:00
RI-10	Demonstrating a knowledge of lubricants	2:00
RI-11	Demonstrating a knowledge of hardware and fasteners	2:00
RI-12	Demonstrating basic metal operations	6:00
RI-13	Demonstrating welding and soldering techniques	6:00
RI-14	Demonstrating a knowledge of applied mathematics	6:00
RI-15	Demonstrating a knowledge of applied science	6:00
		66:00
	MAJOR BLOCK: AUTOMOTIVE SYSTEMS REPAIR	
	Duty I - Perform Service Checks	
AS-01	Checking and changing engine oil and oil filter	2:00
AS-02	Checking fluid level and refilling transmission and rear end	2:00
AS-03	Lubricating chassis and components	2:00
AS-04	Checking and replacing windshield wiper blades	2:00
AS-05	Repairing tires and tubes	2:00
AS-06	Replacing light bulbs and fuses	2:00
AS-07	Washing and waxing vehicle	6:00
AS-08	Performing state inspection	10:00
		28:00

Duty II - Service, Maintain and Repair the Fuel System

AS-09	Adjusting fuel/air mixtures and mechanical linkage	2:00
AS-10	Cleaning or replacing fuel and air filters	2:00
AS-11	Removing carburetor from engine	4:00
AS-12	Disassembling, cleaning and inspecting carburetor	6:00
AS-13	Reassembling and testing carburetor	6:00
AS-14	Testing and replacing fuel pump	4:00
AS-15	Servicing fuel tank, lines, hoses and fuel level monitoring devices	6:00
AS-16	Diagnosing fuel system problems	4:00
		34:00

Duty III - Service, Maintain and Repair the Ignition System

AS-17	Inspecting, selecting and installing spark plugs	4:00
AS-18	Timing the ignition	2:00
AS-19	Inspecting and replacing circuit wiring, distributor cap and rotor	4:00
AS-20	Testing, removing and replacing battery ignition components	6:00
AS-21	Testing, removing and replacing electronic ignition components	10:00
AS-22	Using and interpreting the ignition analyzer	10:00
AS-23	Diagnosing ignition system problems	4:00
		40:00

Duty IV - Service, Maintain and Repair the Starting System

AS-24	Servicing battery and cables	2:00
AS-25	Replacing and rebuilding solenoids and switches	4:00
AS-26	Removing and replacing the starter	4:00
AS-27	Disassembling and inspecting the starter components	4:00
AS-28	Reconditioning the starter components	4:00
AS-29	Reassembling and testing the starter	2:00
AS-30	Diagnosing starting problems	4:00
		24:00

Duty V - Service, Maintain and Repair the Charging System

AS-31	Testing the DC generator and regulator	6:00
AS-32	Testing the alternator and regulator	6:00
AS-33	Removing, disassembling and inspecting the generator	4:00
AS-34	Rebuilding the generator	4:00
AS-35	Removing, disassembling and inspecting the alternator	4:00
AS-36	Rebuilding the alternator	4:00
AS-37	Removing and replacing generators and alternators	2:00
AS-38	Diagnosing charging system problems	4:00
		34:00
	Quarter I Classroom and Lab Hours	226:00
	Quarter I Additional Live Work Hours	86:00
		312:00

Quarter II

Unit/Task	Title	Classroom & Lab hours:minutes
	MAJOR BLOCK: AUTOMOTIVE SYSTEMS REPAIR	
	Duty VI - Service, Maintain and Repair the Heating and Cooling Systems	
AS-39	Checking coolant level and freezing point	2:00
AS-40	Cleaning and flushing the system	4:00
AS-41	Inspecting, adjusting or replacing fan belts and hoses	4:00
AS-42	Testing system with pressure	2:00
AS-43	Removing, repairing and replacing the radiator	6:00
AS-44	Testing and replacing thermostats and radiator caps	4:00
AS-45	Replacing the variable speed fan	2:00
AS-46	Replacing the water pump	6:00
AS-47	Repairing the heater controls	4:00
AS-48	Removing, repairing and replacing the heater core	4:00
AS-49	Diagnosing engine heating and cooling system problems	4:00
		42:00
	Duty VII - Service, Maintain and Repair the Braking System	
AS-50	Identifying brake system components	4:00
AS-51	Adjusting brakes	2:00
AS-52	Removing and rebuilding brake cylinders	8:00
AS-53	Removing and rebuilding brake calipers	6:00
AS-54	Replacing brake shoes and pads	4:00
AS-55	Machining brake drums	4:00
AS-56	Machining brake rotors	4:00
AS-57	Replacing hydraulic control valves and lines	4:00
AS-58	Replacing power brake units	4:00
AS-59	Diagnosing brake system problems	4:00
		44:00
	Duty VIII - Service, Maintain and Repair the Suspension System	
AS-60	Identifying suspension system components	2:00
AS-61	Inspecting suspension system components	2:00
AS-62	Lubricating and adjusting front wheel bearings	2:00
AS-63	Replacing shock absorbers	2:00
AS-64	Replacing front coil springs and rear leaf springs	6:00

AS-65	Changing and balancing wheels and tires	4:00
AS-66	Replacing upper and lower control arms and bushings	8:00
AS-67	Replacing upper and lower ball joints	8:00
AS-68	Replacing king pins and bushings	6:00
AS-69	Replacing torsion bars	4:00
AS-70	Replacing twin I-beams	8:00
AS-71	Diagnosing suspension system problems	8:00
		60:00

Duty IX - Service, Maintain and Repair the Steering System

AS-72	Identifying steering system components	4:00
AS-73	Adjusting manual steering gear	2:00
AS-74	Inspecting and replacing steering gear linkage	4:00
AS-75	Replacing power steering unit	4:00
AS-76	Replacing steering column	4:00
AS-77	Aligning the front-end	8:00
AS-78	Diagnosing steering system problems	4:00
		30:00

Duty X - Service, Maintain and Repair the Emissions Control and Exhaust Systems

AS-79	Identifying emission control components	4:00
AS-80	Measuring exhaust emissions	4:00
AS-81	Testing and replacing components in the positive crankcase ventilation (PCV) system	2:00
AS-82	Testing and replacing components in the fuel evaporative control system	4:00
AS-83	Testing and replacing components in the exhaust gas recirculation (EGR) system	4:00
AS-84	Testing and replacing the catalytic converter	4:00
AS-85	Testing and replacing components in the thermostatic air cleaner system	4:00
AS-86	Testing and replacing components in the air injection reaction (AIR) system	4:00
AS-87	Testing and replacing components in the spark control system	4:00
AS-88	Removing and replacing exhaust pipes, mufflers and tail pipes	6:00
AS-89	Diagnosing emission control and exhaust system problems	4:00
		44:00

Quarter II Classroom and Lab Hours	220:00
Quarter II Additional Live Work Hours	92:00
Total Quarter II hours	312:00

Quarter III

Unit/Task		Classroom & Lab hours:minutes
	MAJOR BLOCK: AUTOMOTIVE ENGINE OVERHAUL	
	Duty I - Recondition Valves	
AE-01	Identifying component parts	2:00
AE-02	Performing the cylinder compression and leakage test	6:00
AE-03	Adjusting the valves	4:00
AE-04	Removing the cylinder head(s)	10:00
AE-05	Removing and inspecting the valves and component parts	6:00
AE-06	Refacing the valves and valve stems	6:00
AE-07	Inspecting the cylinder head	2:00
AE-08	Grinding the valve sets	6:00
AE-09	Servicing the rocker arm, push rod and lifter assemblies	4:00
AE-10	Reassembling and replacing the cylinder head(s)	6:00
AE-11	Diagnosing problems in the valve train	4:00
		56:00
	Duty II - Replace Timing Chain and/or Gears (engine in vehicle)	
AE-12	Removing component parts	6:00
AE-13	Removing vibration damper	2:00
AE-14	Removing front cover	2:00
AE-15	Removing and replacing timing chain(s) and/or gears	6:00
AE-16	Replacing front cover and seal	2:00
AE-17	Diagnosing timing chain problems	2:00
		20:00
	Duty III - Install a Short Block Assembly	
AE-18	Removing engine from vehicle	6:00
AE-19	Removing and inspecting useable parts	8:00
AE-20	Assembling new and used parts on block assembly	12:00
AE-21	Installing engine assembly	8:00
AE-22	Testing engine assembly	2:00
AE-23	Diagnosing internal engine problems	4:00
		40:00

Duty IV: Rebuild Gas Engine Block Assembly

AE-24	Disassembling engine	15:00
AE-25	Cleaning and inspecting block and components	15:00
AE-26	Preparing cylinder block	10:00
AE-27	Installing cam bearings	4:00
AE-28	Installing piston pins and rings	10:00
AE-29	Installing crankshaft	4:00
AE-30	Installing pistons and rod bearings	4:00
AE-31	Installing oil pump, oil pan and component parts	20:00
		82:00
	Quarter III Classroom and Lab Hours	198:00
	Quarter III Additional Live Work Hours	114:00
	Total Quarter III Hours	312:00

Quarter IV

Unit/Task	Title	Classroom & Lab hours:minutes
	MAJOR BLOCK: AUTOMOTIVE ENGINE OVERHAUL	
	Duty V: Test and Repair Automotive Diesel Engines	
AE-32	Comparing the automotive gas and diesel engines	8:00
AE-33	Performing the cylinder compression leakage test	8:00
AE-34	Removing and replacing fuel injectors	15:00
AE-35	Removing and replacing the fuel injection pump	18:00
AE-36	Removing and replacing the turbocharger	18:00
AE-37	Removing the engine from the vehicle	18:00
AE-38	Disassembling and inspecting the engine	18:00
AE-39	Rebuilding the diesel engine	28:00
AE-40	Installing the engine	18:00
AE-41	Testing the engine	8:00
AE-42	Diagnosing diesel engine problems	8:00
		165:00
	Quarter IV Classroom and Lab Hours	165:00
	Quarter IV Additional Live Work Hours	147:00
	Total Quarter IV Hours	312:00

Quarter V

Unit/Task	Title	Classroom & Lab hours:minutes
	MAJOR BLOCK: AUTOMOTIVE ACCESSORIES	
	Duty I - Test and Maintain Electrical Circuits	
AA-01	Replacing wiring and making splices	4:00
AA-02	Testing and maintaining electrical protection devices	10:00
AA-03	Testing and repairing the courtesy light circuit	6:00
AA-04	Testing and repairing the parking light circuit	6:00
AA-05	Testing and repairing the back-up light circuit	6:00
AA-06	Testing and repairing the head light circuit	6:00
AA-07	Testing and repairing the turn signal circuit	6:00
AA-08	Testing and repairing the brake light circuit	6:00
AA-09	Testing and repairing the horn circuit	6:00
AA-10	Testing and repairing the windshield	6:00
AA-11	Testing and repairing the windshield washer circuits	8:00
AA-12	Testing and replacing instrument gauges and sending units	6:00
		76:00
	Duty II - Test and Maintain Electrical Accessories	
AA-13	Testing and repairing the cruise control unit	6:00
AA-14	Testing and repairing the automatic alarm system	4:00
AA-15	Testing and repairing the C.B. radio power circuit	6:00
AA-16	Testing and trimming the radio antenna	4:00
AA-17	Testing and repairing power windows and seats	6:00
AA-18	Testing and repairing fog lights	6:00
		32:00

Duty III - Test and Maintain the Air Conditioning System

AA-19	Testing system performance	6:00
AA-20	Discharging the system	2:00
AA-21	Evaluating and charging the system	4:00
AA-22	Rebuilding compressors	10:00
AA-23	Replacing refrigerant lines and accessories	10:00
AA-24	Installing air conditioning units	30:00
AA-25	Diagnosing air conditioning problems	6:00
		68:00

MAJOR BLOCK: AUTOMOTIVE POWER TRAINS

Duty I - Service, Maintain and Repair the Manual Transmission

PT-01	Adjusting and repairing clutch and shift linkage	10:00
PT-02	Removing and disassembling transmission	15:00
PT-03	Inspecting and reassembling transmission	15:00
PT-04	Removing and replacing clutch assembly	10:00
PT-05	Removing and replacing flywheel ring gear	10:00
PT-06	Diagnosing manual transmission problems	10:00
		70:00

Quarter V Classroom and Lab Hours	246:00
Quarter V Additional Live Work Hours	66:00
Total Quarter V Hours	312:00

Quarter VI

Unit/Task	Title	Classroom & Lab hours:minutes
	MAJOR BLOCK: AUTOMOTIVE POWER TRAINS	
	Duty II - Service, Maintain and Repair the Drive Line and Rear End	
PT-07	Inspecting drive shaft	4:00
PT-08	Removing and replacing universal joint	6:00
PT-09	Removing and replacing constant velocity joints	6:00
PT-10	Removing and replacing rear axle bearings	6:00
PT-11	Removing and disassembling differential assembly	25:00
PT-12	Inspecting and reassembling differential assembly	25:00
PT-13	Removing and replacing front drive axle assembly	30:00
PT-14	Rebuilding the four wheel drive locking hubs	10:00
PT-15	Rebuilding the four wheel drive transfer case	25:00
PT-16	Diagnosing drive line and rear end problems	10:00
		147:00
	Duty III - Service, Maintain and Repair the Automatic Transmission	
PT-17	Testing the automatic transmission	7:00
PT-18	Inspecting and adjusting shift linkage	2:00
PT-19	Removing and replacing the transmission oil filter	6:00
PT-20	Testing and replacing the vacuum modulator	6:00
PT-21	Removing and disassembling transmission	20:00
PT-22	Inspecting and reassembling transmission	20:00
PT-23	Testing transmission on bench	10:00
PT-24	Removing and replacing torque converter	6:00
PT-25	Diagnosing automatic transmission problems	10:00
		87:00
	Quarter VI Classroom and Lab Hours	234:00
	Quarter VI Additional Live Work Hours	78:00
	Total Quarter VI Hours	312:00

SECTION V

UNIT GUIDES

UNIT GUIDES

Description

In this section the tasks to be taught in each course are presented in sequential order. Each task is listed on a separate page so that it may be taken out of the guide for daily lesson planning or regrouped with other tasks to fit the individual teacher's own preference for teaching order. The task pages may be used for planning and executing group instruction or for individualized instruction. Each page in the UNIT GUIDES section contains the following information:

TASK: This is a short and concise statement of the task to be taught.

PERFORMANCE OBJECTIVE: The performance expected of the student after completing the unit is stated in stem form, without a specific statement of all conditions, equipment, and performance standard (these are listed in a criterion referenced measure in the Evaluation section of the task page).

INSTRUCTIONAL ACTIVITIES: Suggested learning activities are presented. These activities include providing information, demonstration, practical applications, and related instruction.

INSTRUCTIONAL MATERIALS: The materials that are necessary to carry out the instructional activities are listed. These include textbooks, audio-visuals and equipment. Textbooks are referenced by author with the title of the book contained in the textbook list in the

Instructional Resource section. In the event of more than one textbook per author then the textbook reference will be numbered.

EVALUATION: This section contains a criterion referenced measure and reference to any test items or other evaluation measures that are available to the teacher. V'TECS catalogs are cross referenced to each program task by task number.

CLASSROOM HOURS: The estimated time for completion of the instructional activities and the evaluation are indicated. This time estimate is stated in hours of classroom time but also includes shop hours.

RELATED INSTRUCTION: For each program task there are Related Instruction tasks (RI-01 through RI-15) which will provide the learner with a strong foundation contributing to successful completion of each program task. Related Instruction can be taught during the first 66 hours of the quarter or as each individual task is presented. The latter option allows almost immediate hands on experiences. If the Related Instruction tasks are taught in conjunction with the program tasks then the instructional time must be increased accordingly. Related instruction pertaining to each task is outlined on each unit guide sheet under the Instructional Activities section. Also, there is a Program Tasks/Related Instruction Matrix at the beginning of this section that cross references Related Instruction tasks to Program tasks.

PROGRAM TASKS			RELATED INSTRUCTION														
			01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
AUTOMOTIVE SYSTEMS REPAIR																	
I.	Perform Service Checks	AS-01	X		X		X					X					
		AS-02	X		X		X					X					
		AS-03	X		X		X					X					
		AS-04	X	X	X												
		AS-05	X		X		X										
		AS-06	X	X	X					X							
		AS-07	X														
		AS-08	X		X	X	X			X			X				
II.	Fuel System	AS-09	X		X		X		X		X						X
		AS-10	X	X	X		X				X						
		AS-11	X		X		X						X				
		AS-12	X		X		X										X
		AS-13	X	X	X		X	X			X		X			X	
		AS-14	X	X	X		X				X		X				X
		AS-15	X	X	X		X				X		X				
		AS-16	X		X	X	X		X		X		X			X	X
III.	Ignition System	AS-17	X	X	X		X			X							
		AS-18	X		X		X	X	X	X							X
		AS-19	X	X	X		X			X					X	X	
		AS-20	X	X	X		X			X			X			X	X
		AS-21	X	X	X		X			X			X			X	X
		AS-22	X		X				X	X							
		AS-23	X		X	X	X		X	X			X			X	X
IV.	Starting System	AS-24	X		X		X			X			X		X		
		AS-25	X	X	X		X			X			X				
		AS-26	X		X		X						X				
		AS-27	X		X		X	X		X			X			X	X
		AS-28	X	X	X		X	X		X			X		X		
		AS-29	X		X		X			X			X				
		AS-30	X		X	X	X		X	X		X	X		X		X

PROGRAM TASKS			RELATED INSTRUCTION														
			01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
V.	Charging System	AS-31	X		X		X			X							
		AS-32	X		X		X			X							
		AS-33	X		X		X	X		X			X			X	
		AS-34	X	X	X		X			X			X		X		
		AS-35	X		X		X	X		X			X			X	
		AS-36	X	X	X		X			X			X		X		
		AS-37	X		X		X			X			X			X	
		AS-38	X		X	X	X		X	X		X	X		X		X
VI.	Heating & Cooling System	AS-39	X		X		X		X								X
		AS-40	X		X		X										
		AS-41	X	X	X		X						X				
		AS-42	X		X		X		X								
		AS-43	X	X	X		X						X		X		
		AS-44	X	X	X		X		X				X				
		AS-45	X	X	X		X						X				
		AS-46	X	X	X		X						X				
		AS-47	X		X		X						X				
		AS-48	X	X	X		X						X		X		
		AS-49	X		X	X	X		X				X		X		X
VII.	Braking System	AS-50	X		X												X
		AS-51	X		X												
		AS-52	X	X	X		X						X				X
		AS-53	X	X	X		X						X				X
		AS-54	X	X	X		X						X				
		AS-55	X		X		X	X								X	
		AS-56	X	X	X		X	X								X	
		AS-57	X	X	X		X						X				X
		AS-58	X	X	X		X						X				X
		AS-59	X		X	X	X						X				X
VIII.	Suspension System	AS-60	X		X												X
		AS-61	X		X		X					X		X			
		AS-62	X		X		X					X	X				X

PROGRAM TASKS		RELATED INSTRUCTION														
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
	AS-63	X	X	X		X						X				X
	AS-64	X	X	X		X						X	X	X		
	AS-65	X		X		X						X			X	
	AS-66	X	X	X		X					X	X	X			
	AS-67	X	X	X		X					X	X	X			
	AS-68	X	X	X		X	X				X	X	X		X	
	AS-69	X	X	X		X						X				
	AS-70	X	X	X		X						X				
	AS-71	X		X	X	X						X				
IX. Steering System	AS-72	X		X												X
	AS-73	X		X		X						X				
	AS-74	X	X	X		X					X	X				
	AS-75	X	X	X		X					X					X
	AS-76	X	X	X		X						X				
	AS-77	X	X	X		X						X			X	
	AS-78	X		X	X	X					X	X			X	X
X. Emissions & Exhaust System	AS-79	X		X				X		X	X					X
	AS-80	X		X		X		X		X	X				X	X
	AS-81	X	X	X		X		X								X
	AS-82	X	X	X		X				X		X				X
	AS-83	X	X	X		X		X				X				
	AS-84	X	X	X		X						X				X
	AS-85	X	X	X		X						X				
	AS-86	X	X	X		X						X				
	AS-87	X	X	X		X		X								
	AS-88	X	X	X		X						X	X	X		
	AS-89	X		X	X	X		X		X	X	X	X			X

PROGRAM TASKS		RELATED INSTRUCTION														
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
AUTOMOTIVE ENGINE OVERHAUL																
I. Recondition Valves	AE-01	X		X			X									
	AE-02	X		X		X		X								X
	AE-03	X		X		X		X				X			X	X
	AE-04	X		X		X						X				
	AE-05	X		X		X	X	X				X			X	
	AE-06	X		X		X	X								X	
	AE-07	X		X			X						X		X	
	AE-08	X		X		X	X								X	
	AE-09	X	X	X		X	X	X			X	X			X	
	AE-10	X	X	X		X		X				X				
	AE-11	X		X	X	X		X				X			X	X
II. Timing Chain	AE-12	X		X		X		X				X				
	AE-13	X		X		X						X				
	AE-14	X		X		X						X				
	AE-15	X	X	X		X	X	X				X				X
	AE-16	X	X	X		X					X	X				
	AE-17	X		X	X	X		X			X	X				X
III. Short Block Assembly	AE-18	X		X		X						X				
	AE-19	X		X		X	X	X				X	X		X	
	AE-20	X	X	X		X		X				X				
	AE-21	X		X		X						X				
	AE-22	X		X		X		X							X	X
	AE-23	X		X	X	X		X				X				X
IV. Rebuild Engine Block Assembly	AE-24	X		X		X						X				
	AE-25	X		X		X	X								X	
	AE-26	X		X		X	X	X				X	X		X	
	AE-27	X	X	X		X	X	X			X	X			X	
	AE-28	X	X	X		X	X	X			X	X			X	
	AE-29	X	X	X		X	X	X			X	X			X	
	AE-30	X	X	X		X	X	X			X	X			X	

PROGRAM TASKS		RELATED INSTRUCTION														
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
	AE-31	X	X	X		X	X	X			X	X			X	
V. Test & Repair Automotive Diesel Engines	AE-32	X						X		X					X	X
	AE-33	X		X		X		X							X	X
	AE-34	X	X	X		X	X	X		X		X				X
	AE-35	X	X	X		X	X	X		X		X				X
	AE-36	X	X	X		X		X				X				X
	AE-37	X		X		X						X				
	AE-38	X		X		X	X	X				X			X	
	AE-39	X	X	X		X	X	X		X	X	X	X		X	X
	AE-40	X		X		X						X				
	AE-41	X		X		X		X								X
	AE-42	X		X	X	X		X	X	X	X	X			X	X

PROGRAM TASKS			RELATED INSTRUCTION														
			01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
AUTOMOTIVE ACCESSORIES																	
I.	Test & Maintain Electrical Circuits	AA-01	X	X	X		X			X					X	X	
		AA-02	X		X		X			X							
		AA-03	X		X		X			X							
		AA-04	X		X		X			X							
		AA-05	X		X		X			X							
		AA-06	X		X		X			X							
		AA-07	X		X		X			X							
		AA-08	X		X		X			X							
		AA-09	X		X		X			X							
		AA-10	X		X		X			X							
		AA-11	X		X		X			X							
		AA-12	X		X		X			X							
II.	Test & Maintain Electrical Accessories	AA-13	X		X		X			X			X				
		AA-14	X		X		X			X			X				
		AA-15	X		X		X			X							
		AA-16	X		X		X										
		AA-17	X		X		X			X			X				
		AA-18	X		X		X			X			X				
III.	Test & Maintain The Air-Conditioning System	AA-19	X		X		X						X				X
		AA-20	X		X		X						X				X
		AA-21	X		X		X						X				X
		AA-22	X	X	X		X	X				X	X				X
		AA-23	X	X	X		X						X		X		X
		AA-24	X		X		X						X		X		
		AA-25	X		X	X	X						X				X

PROGRAM TASKS		RELATED INSTRUCTION														
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
AUTOMOTIVE POWER TRAINS																
I. Service, Maintain & Repair the Manual Transmission	PT-01	X		X		X						X				
	PT-02	X		X		X						X				
	PT-03	X	X	X		X	X					X			X	X
	PT-04	X	X	X		X						X				
	PT-05	X	X	X		X						X		X		
	PT-06	X		X	X	X										X
II. Service, Maintain & Repair the Drive Line and Rear End	PT-07	X		X												X
	PT-08	X	X	X		X					X	X				X
	PT-09	X	X	X		X					X	X				X
	PT-10	X	X	X		X					X	X				X
	PT-11	X		X		X					X					X
	PT-12	X	X	X		X	X				X				X	X
	PT-13	X	X	X		X	X				X				X	X
	PT-14	X	X	X		X					X	X				X
	PT-15	X	X	X		X	X					X			X	X
	PT-16	X		X	X	X					X					X
III. Service, Maintain & Repair the Automatic Transmission	PT-17	X		X		X										X
	PT-18	X		X		X						X				
	PT-19	X	X	X		X					X	X				
	PT-20	X	X	X		X						X				
	PT-21	X		X		X						X				
	PT-22	X	X	X		X	X				X	X			X	X
	PT-23	X		X		X										X
	PT-24	X	X	X		X						X				X
	PT-25	X		X	X	X										X

TASK

RI-01 Demonstrating and utilizing school and shop policies and safety procedures

PERFORMANCE OBJECTIVE

Demonstrate an understanding of school and shop policies and procedures.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Program objectives
b. Career opportunities
c. Grading practices and procedures
d. Safety
e. Using audio visual equipment
f. Using the curriculum materials

Provide Demonstration On:

a. Using audio visual equipment
b. Using curriculum materials
c. Safe operating practices

Provide Practical Application On:

a. Safety practices
b. Using audio visual equipment
c. Using curriculum materials

INSTRUCTIONAL MATERIALS

Textbooks:

a. AAVIM, Developing Shop Safety Skills
b. Ohio State University

A/Vs:

a. AAVIM, "Developing Shop Safety Skills" (Slide set AV903)
b. Georgia Auto Mechanics Program (Slide sets 101-1, 2, 3, 4)

Student Manuals:

a. Georgia Auto Mechanics Program (101-1, 101-2, 101-3, 101-4)
b. School Policies (LEA)
c. AAVIM, Developing Shop Safety Skills (903 SW)

Tools and Equipment:

A/V equipment (Caramate, etc.)

CLASSROOM HOURS 2

EVALUATION (RI-01)

a. Given the necessary information and equipment, the learner will describe the objectives of the program, identify at least five career opportunities, demonstrate correct use of A/V equipment and student manuals and pass the safety exam with 90% accuracy.

b. Shop Safety, the Ohio State University, Trade and Industrial Education.

c. V'TECS, Small Engine Repair; Task No. 11

TASK

RI-02 Maintaining a parts inventory

PERFORMANCE OBJECTIVE

Identify, maintain and locate component parts using the parts manual.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Parts catalog
b. Microfiche readers
c. Parts request forms
d. Locating parts in storeroom
e. Maintaining stock
f. Storing parts
g. Identifying interchangeable parts
h. Posting the parts catalog

Provide Demonstration On:

a. Using the catalog
b. Using the reader
c. Looking up parts
d. Recording part numbers
e. Identifying interchangeable parts
f. Posting the parts catalog

Provide Practical Application On:

a. Looking up parts in the catalog and reader
b. Posting parts catalog

INSTRUCTIONAL MATERIALS

Textbooks:

GMC (Microfiche ED 022 971)

A/Vs:

Briggs & Stratton, Microfiche (Slide set MS-7192)

Tools and Equipment:

a. Microfiche reader
b. Parts catalog
c. Parts forms

CLASSROOM HOURS

2

EVALUATION (RI-02)

a. Given a model number and necessary parts catalog, the learner will identify a part specified by the instructor and locate the parts in the storage area with 100% accuracy.

b. V'TECS, Auto Parts Catalog; Performance Guides

c. V'TECS, Small Engine Repair; Task No. 6, 10, 14, 24, 25, 26

TASK

RI-03 Reading and interpreting the shop service manuals

PERFORMANCE OBJECTIVE

Identify procedures and specifications for tasks outlined in the service manual.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Necessary data required
b. Identifying the correct manual
c. Specification charts
d. Flat rate manuals
e. Updating the manual

Provide Demonstration On:

a. Locating data
b. Reading specification charts
c. Reading flat rate manuals
d. Posting the manual

Provide Practical Application On:

a. Identifying data
b. Using specification charts
c. Using flat rate manual
d. Posting the manual

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Data plate
b. Service manual
c. Flat rate manual

CLASSROOM HOURS 2

EVALUATION (RI-03)

Given a task and a model number, the learner will locate the task in the correct service manual and list the specifications required with 100% accuracy.

TASK

RI-04 Completing job work order forms

PERFORMANCE OBJECTIVE

Greet a customer and fill out the job work order form as per customer complaint.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Customer relations
b. Obtaining data
c. Filling out the form
d. Verifying the complaint
e. Maintaining records
f. Labor costs
g. Determining feasibility of repair

Provide Demonstration On:

a. Greeting customers
b. Acquiring pertinent information
c. Figuring cost

Provide Practical Application On:

a. Greeting customers
b. Filling out the form with necessary information
c. Figuring cost

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Repairable machine
b. Job work order forms
c. Parts catalog
d. Service of shop manual
e. Labor cost guide

CLASSROOM HOURS 2

EVALUATION (RI-04)

a. Given a customer complaint, job work order form and necessary information, the learner will complete the work order form and determine feasibility of repair.

b. V'TECS, Small Engine Repair; Task No. 8, 9, 12, 13, 20

TASK

RI-05 Identifying and maintaining shop tools and equipment

PERFORMANCE OBJECTIVE

Select the correct tool for a specific task and use in a safe manner.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Tool design
b. Tool use and selection
c. Storing equipment
d. Maintaining fire protection equipment
e. Repairing tools
f. Using cleaning equipment

Provide Demonstration On:

a. Selecting and using tools safely
b. Repairing tools
c. Fire codes
d. Using cleaning equipment

Provide Practical Application On:

a. Selecting and using tools
b. Using cleaning equipment
c. Repairing tools

INSTRUCTIONAL MATERIALS

Textbooks:

Crouse & Anglin

A/Vs:

a. Bergwall, "Automotive Hand Tools Explained" (Filmstrip)
b. Prentice-Hall, "Auto Mechanics Tools and Basic Skills" (Filmstrip)

Student Manuals:

MAVCC, Auto Mechanics or Small Engines Program

Tools and Equipment:

a. Discarded parts
b. Hand tools
c. Steam cleaner
d. Parts bath

CLASSROOM HOURS

10

EVALUATION (RI-05)

a. Given a specific task, the learner will select a tool and demonstrate safe and proper use according to job specifications.

b. V'TECS, Small Engine Repair; Task No. 27, 28

TASK

RI-06 Using precision measurement tools and equipment

PERFORMANCE OBJECTIVE

Measure clearances and wear allowances to .0001 of an inch of known value.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Measuring units
b. Plastigage
c. Micrometers
d. Calipers
e. Depth gauges
f. Timing tools

Provide Demonstration On:

a. Reading micrometers and calipers
b. Using plastigage
c. Using and reading depth gauges
d. Using and reading timing tools

Provide Practical Applications On:

a. Measuring tolerances requiring use of several different tools
b. Setting up timing tools

INSTRUCTIONAL MATERIALS

Textbooks:

Stovett

A/Vs:

a. Georgia Metal Fabrication Cluster (Slide set M-1)
b. Prentice Hall, "Machine Shop Bench Operations" (Filmstrip #2, 3)

Student Manuals:

Georgia Metal Fabrication Cluster (M-1)

Tools and Equipment:

a. Micrometers of various sizes
b. Vernier calipers
c. Plastigage
d. Discarded parts to measure
e. Timing tools
f. Engine for timing set-up

CLASSROOM HOURS 6

EVALUATION (RI-06)

Given an out of round crankshaft and necessary tools, equipment and specifications, the learner will determine usability of part according to the specifications.

TASK

RI-07 Demonstrating engine theories of operation

PERFORMANCE OBJECTIVE

Identify and describe the purpose of each component of the gasoline and diesel engine.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Power terms
b. Parts and components
c. Principles of operation
d. Differences between gas and diesel engines

Provide Demonstration On:

a. Relationship of parts
b. Engine operation
c. Compare diesel and gas engines

Provide Practical Application On:

a. Identifying parts
b. Comparing diesel and gas engines

INSTRUCTIONAL MATERIALS

Textbooks:

a. AAVIM Vol. 1, 2
b. Briggs & Stratton
c. Glenn
d. Mitchell
e. Pipe
f. Stephenson
g. Stockel (1)
h. Brady

A/Vs:

a. Bergwall, "The Internal Combustion Engine Explained" (Filmstrip #1); The Four-Cycle Diesel Engine Explained: (Filmstrip)
b. Prentice-Hall, "The Basic Engine" (Filmstrip)

Tools and Equipment:

a. Engine cut-a-way (gas)
b. Engine cut-a-way (diesel)
c. Disassembled engine
d. Shop manuals

CLASSROOM HOURS 6

EVALUATION (RI-07)

Given necessary tools, equipment and engine parts, the learner will identify parts and components and list the operational sequences. This must be done with 80% accuracy.

TASK

RI-08 Demonstrate a knowledge of electricity fundamentals

PERFORMANCE OBJECTIVE

Utilize electrical fundamentals in constructing and testing circuits and computing Ohms law and power formulas.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Electron theory
b. Conductors & insulators
c. Generating and storing electricity
d. Ohms law and power formulas
e. Test meters
f. Circuits & schematics
g. Symbols
h. Solenoids, switches and motors

Provide Demonstration On:

a. Electron theory
b. Generating electricity
c. Wiring circuits
d. Using test motors
e. Testing electrical devices

Provide Practical Application On:

a. Wiring & testing circuits
b. Computing Ohms law and power formula
c. Testing electrical devices

INSTRUCTIONAL MATERIALS

Textbooks:

AAVIM, Understanding Electricity

A/Vs:

a. AAVIM, "Understanding Electricity and Electrical Terms" (Slide set S303; Transp. M303)
b. Prentice-Hall, "Basic Automotive Service" (Filmstrip #5); "Auto Mechanics Tools and Basic Skills" (Filmstrip #6)
c. Briggs & Stratton, "Custom VOA Meter" (Slide set MS-7346 & MS-7343); "Glossary of Electrical Terms" (Slide set MS-7174); "Electricity and Basic Electrical Terms" (Slide set MS-7204)

Tools and Equipment:

a. Wiring board
b. Test meters
c. Small electric devices

CLASSROOM HOURS	6

EVALUATION (RI-08)

a. Given a volt-ohmmeter, a schematic drawing and necessary tools and equipment, the learner will make the necessary wiring connections and record volts, ohms and amperage readings at five different points. All readings must be within 10% of known values.

b. Georgia Electro Mechanical Program, Teacher's Guide Volume IV.

TASK

RI-09 Demonstrating a knowledge of fuels

PERFORMANCE OBJECTIVE

Discriminate between types of fuels and match types with specific uses.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Safety
b. Properties of fuels
c. Selecting fuels
d. Storing and handling fuels

Provide Demonstration On:

Storing and handling fuels

Provide Practical Applications On:

Selecting and refueling an engine

INSTRUCTIONAL MATERIALS

Textbooks:

a. AAVIM, Selecting and Storing Fuels and Lubricants
b. Crouse (1)
c. Stockel (1)

A/Vs:

a. Shell Film Library
b. AAVIM, "Selecting and Storing Fuels and Lubricants" (Slide set S102; Transp, M102)

Student Manuals:

Tools and Equipment:

a. Fuels
b. Fuel containers

CLASSROOM HOURS 2

EVALUATION (RI-09)

Given a selection of fuels and an engine, the learner will refuel the engine with the correct fuel with 100% accuracy.

TASK

RI-10 Demonstrating a knowledge of lubricants

PERFORMANCE OBJECTIVE

List the properties of lubricants and select lubricants for specific jobs.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Properties of lubricants
b. Selecting lubricants
c. Storing and handling lubricants
d. Cleaning lubricants (filters)

Provide Demonstration On:

a. Selecting lubricants
b. Wear due to lack of or dirty lubricants

Provide Practical Applications On:

Changing oil

INSTRUCTIONAL MATERIALS

Textbooks:

a. AAVIM, Small Engines Vol. I, II
b. Crouse (1)
c. Stockel (1)

Tools and Equipment:

a. Various types of oil
b. Various types of grease
c. Oil filters

CLASSROOM HOURS 2

EVALUATION (RI-10)

Given an automobile or small engine powered equipment, the learner will determine the proper lubricant for the engine and chassis. Selection of lubricants must meet manufacturer's specifications.

TASK

RI-11 Demonstrating a knowledge of hardware and fasteners

PERFORMANCE OBJECTIVE

Identify and install hardware and fasteners for specific jobs.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Identification of fasteners
b. Fastener grades
c. Sizing fasteners
d. Torque valves

Provide Demonstration On:

a. Selecting and installing fasteners
b. Tightening fasteners

Provide Practical Applications On:

Selecting and installing fasteners and hardware

INSTRUCTIONAL MATERIALS

Textbooks:

A/Vs:

Prentice-Hall, "Auto Mechanics Tools and Basic Skills" (Filmstrip #3)

Student Manuals:

Tools and Equipment:

a. Selection of fasteners
b. Torque wrenches
c. Sizing tools

(Other materials are available from local nut and bolt supply stores.)

CLASSROOM HOURS 2

EVALUATION (RI-11)

Given a selection of fasteners, the learner will select and install the fastener and tighten according to manufacturer's specifications.

TASK

RI-12 Demonstrating basic metals operations

PERFORMANCE OBJECTIVE

Construct a threaded steel block of given specifications.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Cutting metals
b. Filing and grinding
c. Drilling holes
d. Making threads
e. Removing broken bolts and screws
f. Loosening seized parts
g. Installing threaded inserts

Provide Demonstration On:

a. Using hack saws and files
b. Selecting and using drills
c. Threading stock
d. Removing broken studs
e. Loosening seized parts
f. Installing threaded inserts

Provide Practical Applications On:

a. Constructing a threaded steel block
b. Making threaded studs

INSTRUCTIONAL MATERIALS

Textbooks:

A/Vs:

a. Georgia Transportation Cluster (Slide set HT 3-4)
b. Prentice-Hall, "Machine Shop: Bench Operations" (Filmstrip #2, 3)

Student Manuals:

Georgia Transportation Cluster (HT 3-5)

Tools and Equipment:

a. Metal cutting tools
b. Tap and die set
c. Drills and drill bits
d. Heat lamp or torch
e. Threaded insert kit

CLASSROOM HOURS 6

EVALUATION (RI-12)

Given necessary tools and equipment, the learner will construct a thread guage block and studs. All threaded holes must be at right angles to the gauge block and the studs must turn freely.

TASK

RI-13 Demonstrating welding and soldering techniques

PERFORMANCE OBJECTIVE

Cut and join two pieces of steel together using both gas and electric welding techniques.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Safety
b. Metal composition
c. Affects of heat
d. Flux and filler rods

Provide Demonstration On:

a. Electric welding
b. Gas welding/brazing
c. Cutting metal with a torch
d. Soldering

Provide Practical Applications On:

a. Cutting welding metals using both gas and electric welding equipment
b. Solder wiring using a soldering gun

INSTRUCTIONAL MATERIALS

Textbooks:

Althouse, et.al.

A/Vs:

a. Georgia Metal Fabrication Cluster (Slide sets BW-5; GC 1-5; GW 1-9
b. Scott, "Electric Welding" (closed loop film)
c. Delmar, "Basic Oxyacetylene Welding" (closed loop film)

Student Manuals:

Georgia Metals Fabrication Cluster: BW-5; GC 1-5; GW 1-9

Tools and Equipment:

a. Oxyacetylene outfit
b. Electric welding outfit
c. Soldering gun
d. Welding and soldering materials

CLASSROOM HOURS	6

EVALUATION (RI-13)

a. Given a gas welder and an electric welder, the learner will cut metal and perform a butt weld using each technique. Weld must conform to accepted practices. Given a soldering gun and equipment the learner will join two copper wires together in accordance with accepted practices.

b. Georgia Metal Fabrication Cluster, Pre/Post Checks.

TASK

RI-14 Demonstrating a knowledge of applied mathematics

PERFORMANCE OBJECTIVE

Establish and apply fundamental skills in mathematics to the automotive and transportation trade.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Whole numbers
b. Fractions
c. Decimal equivalents
d. Formulas
e. Ratio and proportion
f. Percentages and averages
g. Measurements

Provide Demonstration On:

Using mathematics for the mechanics trades

Provide Practical Applications On:

a. Determining cubic inch displacement and cubic centimeter displacement
b. Measuring and recording fractions in metric and English versions

INSTRUCTIONAL MATERIALS

Textbooks:

a. Georgia, Vocational Mathematics
b. Olivio
c. Wilton & Rogers

A/Vs:

Prentice-Hall, "Metrics for Auto Mechanics" (Filmstrip)

Student Manuals:

Georgia Transportation Mathematics for Vocational Students (SM.7.35)

Tools and Equipment:

a. Parts to be measured
b. 6 inch rule, micrometers, etc.

CLASSROOM HOURS 6

EVALUATION (RI-14)

Given an engine and necessary tools and equipment, the learner will determine the cubic inch and cubic centimeter displacement, calculate horse power and determine wear tolerances.

TASK

RI-15 Demonstrating a knowledge of applied science

PERFORMANCE OBJECTIVE

Identify principles of science as related to mechanical technology.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. History of the internal combustion engine
b. Work power and force
c. The lever and gear principles
d. Reducing friction
e. Heat characteristics
f. Gases and liquids
g. High and low pressures
h. Energy
i. Atoms and molecules

Provide Demonstration On:

a. Gear trains and levers
b. Bearing construction
c. Heat transfer
d. Liquid transfer
e. The venturi principle
f. Total engine operation

Provide Practical Applications On:

a. Construction of simple machines
b. Construction of electro-magnets

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (1)
b. Jensen
c. Pipe

A/Vs:

Student Manuals:

AAVIM, Ball and Roller Bearings (901)

Tools and Equipment:

a. Mock-up of gear train
b. Roller, needle and ball bearing
c. Engine cut-a-way

CLASSROOM HOURS

6

EVALUATION (RI-15)

Given the necessary tools and equipment, the learner will construct a simple machine and a gear reduction device to specifications. The learner will construct an electro-magnet and list the laws and principles of energy, magnetism and movement. This must be done with 80% accuracy.

TASK

AS-01 Checking and changing engine oil and oil filter

PERFORMANCE OBJECTIVE

Check oil and change oil filter.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Engine oils
b. Oil filters
c. Safety
d. Tools and equipment
e. Procedures

Provide Demonstration On:

a. Twin post lift operation
b. Removal and installation of oil filter
c. Correct removal and torquing of drain plug

Provide Practical Application On:

a. Reading dipstick
b. Draining engine oil
c. Removing and replacing filter
d. Refilling crankcase
e. Checking for leaks

Related Instructions:

Tasks: RI-01; RI-03; RI-0[illegible]; RI-10

INSTRUCTIONAL MATERIALS

Textbooks:

a. Glenn
b. Remling (1)
c. Toboldt & Johnson

A/Vs:

a. Georgia Transportation Cluster (Slide set CL-1, CL-2)
b. Georgia Auto Mechanics Program (Slide set 212-2)
c. Bergwall, "Lubrication Services" (Filmstrip #1)
d. Prentice-Hall, "Basic Automotive Service" (Filmstrip #2)

Student Manuals:

a. Georgia Transportation Cluster (CL-1, CL-2)
b. Georgia Auto Mechanics Program (212-2)
c. Oklahoma, Auto Mechanics I

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CLASSROOM HOURS 2

EVALUATION (AS-01)

a. Given an operational vehicle, tools and equipment, the learner will change oil and oil filter according to specifications given by manufacturer. There must be no evidence of oil leaks after engine is warmed up.

b. Oklahoma, Auto Mechanics I

c. Bergwall, filmstrip questions

d. Textbooks include test questions

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Hand tools
b. Oil filter wrench
c. Drain
d. Twin post lift
e. Oil spout
f. Shop towels
g. Fender covers

TASK

AS-02 Checking fluid level and refilling transmission and rear end

PERFORMANCE OBJECTIVE

Check fluid levels and refill transmission and rear end.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Types and application of transmission fluids
b. Viscosities of rear end lubricant
c. Effects of temperature to fluids

Provide Demonstration On:

a. Twin post lift operation
b. Use of lube dispenser

Provide Practical Application On:

a. Use of transmission level guage
b. Pumping lube with lube dispenser

Related Instructions:

Tasks: RI-01; RI-03; RI-05; RI-10

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)(8)
b. Remling (1)

A/Vs:

a. Georgia Transportation Cluster (Slide set CL-5)
b. Bergwall, "Lubrication Services" (Filmstrip #1)
c. Prentice-Hall, "Basic Automotive Service" (Filmstrip #2)

Student Manuals:

a. Georgia Transportation Cluster (CL-5)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Hand tools
b. Gear lube dispenser
c. Transmission filler

CLASSROOM HOURS

2

EVALUATION (AS-02)

a. Given an operational vehicle, tools and equipment, the learner will check fluid level of transmission and rear end and refill, if needed. Upon completion there must be no evidence of leaks.

b. Oklahoma, Auto Mechanics II

c. Bergwall, filmstrip questions

d. Textbooks include test questions

TASK

AS-03 Lubricating chassis and components

PERFORMANCE OBJECTIVE

Lubricate the chassis and components of an automobile.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Chassis grease
b. Lubricating equipment

Provide Demonstration On:

a. Correct procedure on cleaning grease fittings before applying grease
b. How to determine correct amount of grease to apply

Provide Practical Application On:

a. Location of grease fittings on components
b. Pumping correct amounts of grease into components

Related Instructions:

Tasks: RI-01; RI-03; RI-05; RI-10

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)(8)
b. Remling (1)
c. Stockel (1)

A/Vs:

a. Georgia Transportation Cluster (Slide set CL-4)
b. Georgia Auto Mechanics (Slide set 212-3)
c. Bergwall, "Lubrication Services" (Filmstrip #1)
d. Prentice-Hall, "Basic Automotive Service" (Filmstrip #2)

Student Manuals:

a. Georgia Transportation Cluster (CL-4)
b. Georgia Auto Mechanics (212-3)

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CLASSROOM HOURS

2

EVALUATION (AS-03)

a. Given an automobile, the learner will be able to identify chassis components and determine the need of grease. The learner will apply grease, according to manufacturer's specifications, without damaging components or grease pockets.

b. Bergwall, filmstrip questions

c. Textbooks include test questions

d. V'TECS, Automotive Mechanics; Task No. 36, 143, 147, 194, 195

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Grease gun
b. Rags
c. Vehicle

TASK

AS-04 Checking and replacing windshield wiper blades

PERFORMANCE OBJECTIVE

Check and replace worn windshield wiper blades.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Blade types
b. Blade safety regulation
c. Windshield wiper blade mechanisms

Provide Demonstration On:

a. Blade inspection
b. Blade removal

Provide Practical Application On:

a. Inspect blade for abrasions or tears
b. Remove and replace blade

Related Instructions:

Tasks: RI-01-03

INSTRUCTIONAL MATERIALS

Textbooks:

Crouse & Anglin (1)

A/Vs:

Student Manuals:

Tools and Equipment:

a. Windshield wiper arm removing tool
b. Shop manual
c. Wiper blades

CLASSROOM HOURS 2

EVALUATION (AS-04)

a. Given an automobile, the learner will inspect the windshield wiper blades and replace according to procedures found in the Shop Manual.

b. V'TECS, Automotive Mechanics; Task No. 1

TASK

AS-05 Repairing tires and tubes

PERFORMANCE OBJECTIVE

Repair a leak in a tubeless tire and patch a tube.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Tire constructor
b. Tire types
c. Safety
d. Types and sizes of plugs and patches

Provide Demonstration On:

a. Patching tube type tire
b. Patching tubeless type tire
c. Hot and cold patches
d. Using tire changing equipment

Provide Practical Application On:

a. Locating air leak
b. Patch tube with hot patch
c. Patch tube with cold patch
d. Plug hole in tubeless tire with vulcanizing plug applicator
e. Dismount and remount tire on rim

Related Instructions:

Tasks: RI-01; RI-03; RI-05

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)(8)
b. Toboldt & Johnson

A/Vs:

a. Georgia Transportation Cluster (Slide set SSS-3)
b. Prentice-Hall, Basic Automotive Service" (Filmstrip #3)

Student Manuals:

a. Georgia Transportation Cluster (SSS-3)
b. Oklahoma, Auto Mechanics I

Tools and Equipment:

a. Leak test tank
b. Tire changer
c. Marking crayon
d. Buffing tool
e. Plug applicator
f. Stitching tool

CLASSROOM HOURS 2

EVALUATION (AS-05)

a. Given a tire with an air leak, the learner will plug or patch the tubless tire and patch a hole in a tube. Each exercise will be tested in a test tank to determine success. Patched or plugged areas must not leak and tire must hold specified pounds per square inch recommended by manufacturer.

b. Oklahoma, Auto Mechanics I

c. Crouse, The Auto Book & Auto Study Guide

d. Textbooks include test questions

TASK

AS-06 Replacing light bulbs and fuses

PERFORMANCE OBJECTIVE

Check and replace burned out light bulbs and fuses.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Sizes and types of light bulbs
b. Sizes and resistances of fuses
c. Procedure to determine malfunction of fuse
d. Electrical wiring diagrams

Provide Demonstration On:

a. Blown or malfunctioning fuse
b. Blown or malfunctioning light bulb
c. Checking bulb and fuse circuits

Provide Practical Application On:

a. Locating fuse box
b. Locating light bulbs
c. Removing fuses from holders
d. Removing light bulbs from sockets

Related Instructions:

Tasks: RI-01-03; RI-08

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)(8)
b. Remling (1)
c. Stockel (1)

A/Vs:

Prentice-Hall, "Basic Automotive Service" (Filmstrip #1)

Student Manuals:

a. Oklahoma, Auto Mechanics II
b. Ellinger, Automotive Electrical Systems

Tools and Equipment:

a. Hand tools
b. VOM
c. Test light
d. Auto shop manaul

CLASSROOM HOURS

2

EVALUATION (AS-06)

a. Given an operational automobile, the learner will test and replace defective bulbs and fuses according to specifications.

b. Oklahoma, Auto Mechanics II

c. Textbooks include test questions

d. V'TECS, Automotive Mechanics; Task No. 89, 97

TASK

AS-07 Washing and waxing vehicle

PERFORMANCE OBJECTIVE

Wash and wax a vehicle protecting and restoring finish.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Detergents
b. Addatives
c. Waxes

Provide Demonstration On:

a. Mixing solution for washing
b. Washing a vehicle
c. Wax application

Provide Practical Application On:

Wash and wax a vehicle

Related Instructions:

Tasks: RI-01

INSTRUCTIONAL MATERIALS

Textbooks:

A/Vs:

Student Manuals:

Vehicle owner's manual

Tools and Equipment:

a. Detergent
b. Pail
c. Wipe cloth
d. Brushes
e. Chamois

CLASSROOM HOURS

6

EVALUATION (AS-07)

Given an automobile, the learner will wash and wax it, restoring its finish to manufacturer's recommendations.

TASK

AS-08 Performing state inspection

PERFORMANCE OBJECTIVE

Perform complete state safety inspection on a passenger car.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. State safety laws
b. Inspecting station requirements
c. Motor vehicle inspection rules
d. Inspection forms and stickers
e. Station monthly reports

Provide Demonstration On:

a. Checking lighting systems
b. Checking brake systems
c. Checking exhaust systems
d. Checking horn system
e. Checking tires
f. Checking steering system
g. Checking windshield wiper blades and the windshield

Provide Practical Application On:

a. Check lights
b. Check brakes
c. Check exhaust system
d. Check horn
e. Check tires
f. Check steering
g. Check windshield wiper blades
h. Check windshield for cracks
i. Fill out inspection form
j. Fill out rejection form
k. Write station monthly report

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INSTRUCTIONAL MATERIALS

Textbooks:

a. Billiet & Alley
b. Crouse & Anglin (1)(8)
c. Remling (1)
d. Toboldt & Johnson

A/Vs:

Student Manuals:

a. Georgia, Official Motor Vehicle Inspection Manual
b. Oklahoma, Auto Mechanics I, II

Tools and Equipment:

a. Heat light testing equipment
b. Equalization tester
c. Brake living gauge
d. Tire tread gauge
e. Hand tools
f. Pry bar
g. Floor jack

CLASSROOM HOURS

10

EVALUATION (AS-08)

a. Given an operational vehicle, the learner will perform a complete safety inspection to comply with laws enforced by the State of Georgia.

b. Oklahoma, Auto Mechanics, Vol. I, II

c. Textbooks include test questions

INSTRUCTIONAL ACTIVITIES

Related Instructions:

Tasks: RI-01; RI-03-05; RI-08; RI-11

TASK

AS-09 Adjusting fuel/air mixtures and mechanical linkage

PERFORMANCE OBJECTIVE

Adjust fuel/air mixtures and carburetor linkage.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Fuels
b. Carburetion principles
c. Instrumentation

Provide Demonstration On:

a. Adjust carburetor
b. Types of linkage

Provide Practical Application On:

a. Adjusting carburetor manual type transmission
b. Adjusting carburetor on automatic type transmission
c. Adjusting carburetor with cruise control unit

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-07; RI-09; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (4)
b. Stockel (1)

A/Vs:

a. Georgia Transportation Cluster (Slide set FS-4)
b. Bergwall, "The Operation of the Fuel System Explained" (Filmstrip #3)
c. Ford, "Fuel and Carburetion" (Filmstrip/tape 2400-015)

Student Manuals:

a. Oklahoma, Auto Mechanics I
b. Georgia Transportation Cluster (FS-4)
c. Ford, Student Text (2400-015 TXT)

Tools and Equipment:

a. Hand tools
b. Dwell tach
c. Manufacturer's repair manual or auto shop repair manual

CLASSROOM HOURS

2

EVALUATION (AS-09)

a. Given an operational automotive engine and necessary tools and equipment, the learner will adjust fuel/air mixtures to standards of auto shop repair manual. The learner will adjust mechanical linkage to allow full opening and closing of the throttle with no binding. The learner will adjust mechanical linkage to allow correct working of automotive transmission throttle linkage.

b. Crouse & Anglin, Auto Study Guides

c. Bergwall, filmstrip questions

d. Hughes, Guide to the Automobile Mechanic Certification Exam

e. V'TECS, Automotive Mechanics; Task No. 108, 114, 115

f. Georgia Student Assessment System, Domain Referenced Tests; Transporation/Automotive Mechanics, Volume I, II

g. Oklahoma, Auto Mechanics I

TASK

AS-10 Cleaning or replacing fuel and air filters

PERFORMANCE OBJECTIVE

Clean or replace fuel and air filters as required.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Fuels
b. Carburetion
c. Filters

Provide Demonstration On:

a. Replacing fuel and air filters
b. Cleaning fuel and air filters

Provide Practical Application On:

a. Cleaning fuel and air filter
b. Replacing air filter
c. Replacing in-line fuel filter
d. Replacing carburetor fuel filter

Related Instruction:

Tasks: RI-01-03; RI-05; RI-09

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (4)
b. Stockel (1)

A/Vs:

a. Bergwall, "The Operation of the Fuel System Explained" (Filmstrip #2)
b. Georgia Auto Mechanics Program (Slide set 213-10)

Student Manuals:

a. Oklahoma, Auto Mechanics I
b. Georgia Auto Mechanics Program (213-10)

Tools and Equipment:

a. Hand tools
b. Air filter tester of drop-light

CLASSROOM HOURS 2

EVALUATION (AS-10)

a. Given an operational automotive engine and necessary tools and equipment, the learner will clean and/or replace the fuel and air filters according to manufacturer's specifications.

b. Crouse & Anglin, Auto Study Guide

c. Bergwall, filmstrip questions

d. Hughes, Guide to the Automobile Mechanic Certification Exam

e. V'TECS, Automotive Mechanics; Task No. 112, 113, 116

f. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Volume I, II.

g. Oklahoma, Auto Mechanics I

TASK

AS-11 Removing carburetor from engine

PERFORMANCE OBJECTIVE

Remove carburetor from engine.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

Carburetion

Provide Demonstration On:

Removing carburetor

Provide Practical Application On:

a. Removing 2 BBL carburetor
b. Removing 4 BBL carburetor

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (4)
b. Stockel (1)

A/Vs:

Ford, "Carburetor Two and Four Venturi" (Transparencies 2400-009)

Student Manuals:

Oklahoma, Auto Mechanics I

Tools and Equipment:

Hand tools

CLASSROOM HOURS 4

EVALUATION (AS-11)

a. Given an operational automotive engine and necessary tools and equipment, the learner will remove a 2BBL and a 4BBL carburetor from the engine. The learner will mark all vacuum hoses for later identification purposes.

b. Crouse & Anglin, Auto Study Guide

c. Hughes, Guide to Automobile Mechanics Certification Exam

d. Oklahoma, Auto Mechanics I

TASK

AS-12 Disassembling, cleaning and inspecting carburetor

PERFORMANCE OBJECTIVE

Disassemble, clean and inspect carburetor.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Carburetion
b. Carburetor circuits
c. Carburetor cleaning fluid

Provide Demonstration On:

a. Carburetor disassembly
b. Carburetor cleaning
c. Carburetor inspection

Provide Practical Application On:

a. Disassembling 2BBL and 4BBL carburetor
b. Cleaning 2BBL and 4BBL carburetor
c. Inspecting 2BBL and 4BBL carburetor

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (4)
b. Stockel (2)

A/Vs:

a. Georgia Transportation Cluster (Slide set FS-3A, FS-3B, FS-5A, FS-5B)
b. Georgia Auto Mechanics Program (Slide sets 213-3A, 4, 5, 6, 7)
c. Bergwall, "The Operation of the Fuel System Explained" (Filmstrip #3, 4)
d. Ford, "Carburetor Service" (Slide set 2400-020)
e. Prentice-Hall "Fuel Service" (Filmstrip XF948)

Student Manuals:

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CLASSROOM HOURS 6

EVALUATION (AS-12)

a. Given a 2BBL or 4BBL carburetor and necessary tools and equipment, the learner will disassemble, clean and inspect the carburetor parts according to standards of auto shop repair manual.

b. Crouse & Anglin, The Auto Book

c. Crouse & Anglin, Auto Study Guide

d. Bergwall, filmstrip questions

e. Hughes, Guide to the Automobile Mechanic Certification Exam

f. V'TECS, Automotive Mechanics; Task No. III

g. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Volume I, II

h. Oklahoma, Auto Mechanics I

INSTRUCTIONAL MATERIALS

Student Manuals:

a. Georgia Transportation Cluster (FS-3, FS-5)
b. Georgia Auto Mechanics Program (213-3, 4, 5, 6, 7)
c. Ford (2400-016, 018)
d. Oklahoma, Auto Mechanics I

Tools and Equipment:

a. Hand tools
b. Carburetor repair tools
c. Auto shop repair manual

TASK

AS-13 Reassembling and testing carburetor

PERFORMANCE OBJECTIVE

Reassemble and test carburetor.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Carburetion
b. Carburetor circuits
c. Carburetor gauge tools
d. Instrumentation

Provide Demonstration On:

a. Carburetor assembly
b. Carburetor circuits adjustment
c. Carburetor installation
d. Instrument test

Provide Practical Application On:

a. Assembling 2BBL and 4BBL carburetor
b. Carburetor circuit adjustment
c. Carburetor installation
d. Instrument testing

Related Instruction:

Tasks: RI-01-03; RI-05-06; RI-09; RI-11; RI-14

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (4)
b. Stockel (2)

A/Vs:

a. (See task AS-12)
b. Bergwall, "How to Overhaul a Carburetor" (Filmstrip #421)

Student Manuals:

(See task AS-12)

Tools and Equipment:

a. Hand tools
b. Carburetor repair tools
c. Dwell tach
d. Auto shop repair manual

CLASSROOM HOURS 6

EVALUATION (AS-13)

a. Given a 2BBL or 4BBL carburetor, an operational automotive engine and necessary tools and equipment, the learner will assemble carburetor to standards of auto shop repair manual. The learner will install carburetor on engine and make necessary adjustments to meet manufacturer's standards.

b. Crouse & Anglin, The Auto Book & Auto Study Guide

c. Bergwall, filmstrip questions

d. Hughes, Guide to the Automobile Mechanic Certification Exam

e. V'TECS, Automotive Mechanics; Task No. 118

f. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Volume I, II

g. Oklahoma, Auto Mechanics I

TASK

AS-14 Testing and replacing fuel pumps

PERFORMANCE OBJECTIVE

Test and replace fuel pump.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Fuel systems
b. Fuel pumps
c. Fuel lines

Provide Demonstration On:

a. Using a fuel pump pressure gauge
b. Using a fuel pump flow meter
c. Replacing manual fuel pump
d. Replacing electric fuel pump

Provide Practical Application On:

a. Using a fuel pump pressure gauge
b. Using a fuel pump flow meter
c. Replacing manual fuel pump
d. Replacing electric fuel pump

Related Instruction:

Tasks: RI-01-03; RI-05; RI-09; RI-11; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (4)
b. Stockel (2)

A/Vs:

a. Georgia Transportation Cluster (Slide set FS-2)
b. Georgia Auto Mechanics Program (Slide set 213-2)
c. Bergwall, "The Operation of the Fuel System Explained" (Filmstrip #1)

Student Manuals:

a. Georgia Transportation Cluster (FS-2)
b. Georgia Auto Mechanics Program (213-2)
c. Oklahoma, Auto Mechanics I

Tools and Equipment:

a. Hand tools
b. Pressure gauge
c. Flow meter

CLASSROOM HOURS 4

EVALUATION (AS-14)

a. Given an operational automobile fuel system and necessary tools and equipment, the learner will test and/or replace the fuel pump according to standards of auto shop repair manual.

b. Crouse & Anglin, The Auto Book & Auto Study Guide

c. Bergwall, filmstrip questions

d. Hughes, Guide to the Automobile Mechanic Certification Exam

e. V'TECS, Automotive Mechanics; Task No. 119, 122

f. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Volume I, II

g. Oklahoma, Auto Mechanics I

TASK

AS-15 Servicing fuel tank, lines, hoses and fuel level monitoring devices

PERFORMANCE OBJECTIVE

Service fuel tank, lines, hoses and fuel level monitoring devices.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Fuel systems
b. Fuel lines
c. Fuel gauges
d. Volt-ohmmeter

Provide Demonstration On:

a. Removal and service of fuel tank
b. Service fuel gauge dash unit
c. Service fuel gauge tank sending unit

Provide Practical Application On:

a. Removing and servicing fuel tank
b. Removing and servicing dash unit fuel gauge
c. Removing and servicing tank sending unit

Related Instruction:

Tasks: RI-01-03; RI-05; RI-09; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (4)
b. Stockel (2)

A/Vs:

a. Georgia Transportation Cluster (Slide set FS-1)
b. Georgia Auto Mechanics Program (Slide set 213-1)
c. Bergwall, "The Operation of the Fuel System Explained" (Filmstrip #1)

Student Manuals:

a. Georgia Transportation Cluster (FS-1)
b. Georgia Auto Mechanics Program (213-1)
c. Oklahoma, Auto Mechanics I

Tools and Equipment:

a. Hand tools
b. Volt-ohmmeter

CLASSROOM HOURS 6

EVALUATION (AS-15)

a. Given an operational automotive fuel system and necessary tools and equipment, the learner will service and test the fuel tank, lines and hoses. The learner will also service and test the dash gauge unit and the tank gauge unit according to standards of Auto Shop Repair Manual.

b. Crouse & Anglin, The Auto Book & Auto Study Guide

c. Bergwall, filmstrip questions

d. Hughes, Guide to the Automobile Mechanics Certification Exam

e. V'TECS, Automotive Mechanics; Task No. 109, 117, 123

f. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Volume I, II

g. Oklahoma, Auto Mechanics I

TASK

AS-16 Diagnosing fuel system problems

PERFORMANCE OBJECTIVE

Develop a troubleshooting plan for locating problems in the fuel system.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Fuels
b. Carburetion
c. Instrumentation
d. Filters
e. Carburetor circuits

Provide Demonstration On:

a. Carburetor with low or high float
b. Clogged fuel filter
c. Maladjusted air/fuel mixture
d. Improper or non-functional fuel pump
e. Maladjusted accelerator pump

Provide Practical Application On:

a. Locating of carburetor low or high float level
b. Locating clogged fuel filter
c. Determining maladjusted air/fuel mixture
d. Determining improper or non-functional fuel pump
e. Determining maladjusted accelerator pump

Related Instruction:

Tasks: RI-01; RI-03-05; RI-07; RI-09; RI-11; RI-14-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (4)
b. Stockel (2)

A/Vs:

a. Georgia Transportation Cluster (Slide set FS-1 thru FS-5B)
b. Bergwall, "The Operation of the Fuel System Explained" (Filmstrip #1 thru #5)

Student Manuals:

a. Oklahoma, Auto Mechanics I
b. Ford, "Carburetor Diagnosis" (2412-001)

Tools and Equipment:

a. Hand tools
b. Dwell tach
c. Carburetor repair tools
d. Pressure gauge
e. Volt-ohmmeter
f. Auto shop repair manual

CLASSROOM HOURS 4

EVALUATION (AS-16)

a. Given an operational automotive engine with an inoperative fuel system and necessary tools and equipment, the learner will develop a troubleshooting plan and determine the cause of the problem within double the standard flat rate time.

b. Crouse & Anglin, The Auto Book & Auto Study Guide

c. Bergwall, filmstrip questions

d. Hughes, Guide to the Automobile Mechanic Certification Exam

e. Oklahoma, Auto Mechanics I

TASK

AS-17 Inspecting, selecting and installing spark plugs

PERFORMANCE OBJECTIVE

Inspect, select and install spark plugs.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Ignition secondary circuit
b. Spark plugs
c. Instrumentation

Provide Demonstration On:

a. Spark plug removal/installation
b. Spark plug construction
c. Effects of wrong spark plug heat range
d. Spark plug selection

Provide Practical Application On:

a. Spark plug removal.
b. Spark plug slection by engine type and plug heat range
c. Spark plug installation

Related Instruction:

Tasks: RI-01-03; RI-05; RI-08

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (7)
b. Wetzel

A/Vs:

a. Georgia Transportation Cluster (Slide set SPS-1 thru SPS-5)
b. Georgia Auto Mechanics Program (Slide set 223-9)
c. Bergwall, "The Ignition System Explained" (Filmstrip #1, 3, 4)
d. Prentice-Hall "Electrical Ingition Service" (Flimstrip #1)

Student Manuals:

a. Georgia Transportation Cluster (SPS-1, 2, 3, 4, 5)
b. Georgia Auto Mechanics Program (223-9)
c. Oklahoma, Auto Mechanics II

Tools and Equipment:

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CLASSROOM HOURS 4

EVALUATION (AS-17)

a. Given an operational automotive engine and necessary tools and equipment, the learner will remove, select and install spark plugs according to standards of auto shop repair manual.

b. Crouse & Anglin, Automotive Tune-up

c. Wetzel, Automotive Diagnosis and Tune-up

d. Bergwall, filmstrip questions

e. Hughes, Guide to Automobile Mechanic Certification Exam

f. V'TECS, Automotive Mechanics; Task No. 78

g. Georgia Student Assessemnt System, Domain Referenced Tests; Transportation/Automotive Mechanics, Volume I, II

h. Oklahoma, Auto Mechanics II

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Hand tools
b. Dwell tach
c. Spark plug gapping tool
d. Spark plug cleaner/tester
e. Auto shop manual

TASK

AS-18 Timing the ignition

PERFORMANCE OBJECTIVE

Time the ignition spark to piston travel.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Ignition system
b. Instrumentation
c. Timing requirements

Provide Demonstration On:

a. Using dwell tach meter
b. Using timing light
c. Timing the ignition

Provide Practical Application On:

a. Using dwell tach
b. Using timing light
c. Timing the ignition

Related Instruction:

Tasks: RI-01; RI-03; RI-05-08; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (7)
b. Wetzel

A/Vs:

a. Georgia Transportation Cluster (Slide set TID-5)
b. Bergwall, "The Ignition System Explained" (Filmstrip #2)

Student Manuals:

a. Georgia Transportation Cluster (TID-5)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Hand tools
b. Dwell tach
c. Timing light
d. Auto shop repair manual

CLASSROOM HOURS

2

EVALUATION (AS-18)

a. Given an operational automotive engine and necessary tools and equipment, the learner will set the timing within one degree of specifications of auto shop repair manual.

b. Crouse & Anglin, Automotive Tune-up

c. Wetzel, Automotive Diagnosis and Tune-up

d. Bergwall, filmstrip questions

e. Hughes, Guide to the Automobile Mechanic Certification Exam √

f. V'TECS, Automotive Mechanics; Task No. 103

g. Oklahoma, Auto Mechanics II

TASK

AS-19 Inspecting and replacing circuit wiring, distributor cap and rotor

PERFORMANCE OBJECTIVE

Inspect and replace primary and secondary wiring, distributor cap and rotor.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Ignition system
b. Secondary ignition circuit
c. Distributor cap and rotor
d. Engine firing orders

Provide Demonstration On:

a. Replacing circuit wiring
b. Replacing distributor cap and rotor
c. Testing circuit wiring

Provide Practical Application On:

a. Replacing circuit wiring
b. Replacing distributor cap and rotor
c. Testing circuit wiring

Related Instruction:

Tasks: RI-01-03; RI-05; RI-08; RI-13; RI-14

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (7)
b. Wetzel

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 223-8)
b. Bergwall, "The Ignition System Explained" (Filmstrip #1, 2)

Student Manuals:

a. Georgia Auto Mechanics Program (223-8)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Hand tools
b. Dwell tach
c. Volt-ohmmeter
d. Auto shop repair manual

CLASSROOM HOURS

4

EVALUATION (AS-19)

a. Given an operational automotive engine and necessary tools and equipment, the learner will inspect, test and replace circuit wiring, distrubutor cap and rotor according to specifications of auto shop repair manual.

b. Crouse & Anglin, Automotive Tune-up

c. Wetzel, Automotive Diagnosis and Tune-up

d. Bergwall, filmstrip questions

e. Hughes, Guide to the Automobile Mechanic Certification Exam

f. V'TECS, Automotive Mechanics; Task No. 80

g. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Volume I, II

h. Oklahoma, Auto Mechanics II

TASK

AS-20 Testing, removing and replacing battery ignition components

PERFORMANCE OBJECTIVE

Test, remove and replace the breaker points, condenser and ignition coil.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Ignition breaker points
b. Ignition condenser
c. Ignition coil
d. Ignition wire coil to points
e. Breaker plate
f. Instrumentation

Provide Demonstration On:

a. Replacing breaker points
b. Testing coil and condenser
c. Testing coil wire to points
d. Inspect/replace breaker plate

Provide Practical Application On:

a. Replace and set breaker points
b. Test/replace condenser
c. Test/replace coil
d. Test/replace ignition wire coil to points
e. Inspect/replace breaker plate

Related Instruction:

Tasks: RI-01-03; RI-05; RI-08; RI-11; RI-14-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (7)
b. Wetzel

A/Vs:

a. Georgia Transportation Cluster (Slide set TIC 1, 2; TID 3)
b. Georgia Auto Mechanics Program (Slide set 223-10A; Filmstrip 223-10B)
c. Ford, "Ignition Systems" (Slide set 2301-005) or "Ignition System Principles of Operation" (Filmstrip 2301-101)
d. Bergwall, "How to Do a Major Tune-up" (Filmstrip #1) "Ignition System Explained" (Filmstrip #1)
e. Prentice-Hall "Electrical Ignition Service" (Filmstrip #2)

Student Manuals:

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CLASSROOM HOURS 6

EVALUATION (AS-20)

a. Given an operational automotive engine and necessary tools and equipment, the learner will test, inspect, remove and replace battery ignition components according to specifications of auto shop repair manual.

b. Crouse & Anglin, The Auto Book & Auto Study Guide & Automotive Tune-up

c. Wetzel, Automotive Diagnosis and Tune-up

d. Bergwall, filmstrip questions

e. Hughes, Guide to the Automobile Mechanic Certification Exam

f. V'TECS, Automotive Mechanics, Task No. 81, 82, 96, 99, 100

g. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Volume I, II

h. Oklahoma, Auto Mechanics II

INSTRUCTIONAL MATERIALS

Student Manuals:

a. Georgia Transportation Cluster (TIC 1, 2; TID-3)
b. Georgia Auto Mechanics Program (223-10)
c. Ford, "Ignition Systems" (2301-005), "Ignition System Principles of Operation" (2301-102)
d. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Hand tools
b. Dwell tach
c. Coil condenser tester
d. Volt-ohmmeter
e. Auto shop repair manual

TASK

AS-21 Testing, removing and replacing electronic ignition components

PERFORMANCE OBJECTIVE

Test, remove and replace electronic ignition components.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Point-controlled
b. Magnetic-pulse or breakerless
c. Photoelectric cell
d. Light-emitting diode
e. Capacitor discharge

Provide Demonstration On:

a. Test, remove and replace components, point-controlled
b. Test, remove and replace magnetic-pulse or breakerless
c. Test, remove and replace photoelectric cell
d. Test, remove and replace light-emitting diode
e. Test, remove and replace capacitor discharge

Provide Practical Application On:

a. Test, remove and replace components in point-controlled
b. Test, remove and replace components in magnetic-pulse or breakerless
c. Test, remove and replace components in photoelectric cell

continued on back

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (7)
b. Johnson

A/Vs:

a. Bergwall, "Electronic Ignition Explained" (Filmstrip #1, 2)
b. Ford, "Solid State Ignition Systems" (Slide set 2301-006)
c. Georgia Auto Mechanics Program (Filmstrip 262-4)
d. Prentice-Hall (Filmstrip #1, 3, 5)

Student Manuals:

a. Ford, "Solid State Ignition Systems" (2301-006)
b. Georgia Auto Mechanics Program (262-4)
c. Oklahoma, Auto Mechanics II

Tools and Equipment:

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CLASSROOM HOURS

10

EVALUATION (AS-21)

a. Given an operational automotive engine, containing one of the five major electronic ignition systems, necessary tools and equipment, the learner will identify the system and test, remove and replace electronic ignition components according to specifications of auto shop repair manual.

b. Crouse & Anglin, The Auto Book, Auto Study Guide & Automotive Tune-up

c. Johnson, Automotive Diagnosis and Tune-up

d. Bergwall, filmstrip questions

e. Hughes, Guide to the Automobile Mechanic Certification Exam

f. V'TECS, Automotive Mechanics; Task No. 107

g. Oklahoma, Auto Mechanics II

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

d. Test, remove and replace components in light-emitting diode
e. Test, remove and replace components in capacitor discharge

Related Instruction:

TAsks: RI-01-03; RI-05; RI-08

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Hand tools
b. Dwell tach
c. Voltmeter
d. Ammeter
e. Ohmmeter
f. Auto shop manual

TASK

AS-22 Using and interpreting the ignition analyzer

PERFORMANCE OBJECTIVE

Hook-up and interpret the ignition analyzer (scope).

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Initial set up and lead connections
b. Interpreting scope patterns
c. Programming scope controls
d. Meter usage

Provide Demonstration On:

a. Set up and lead connections
b. Standard ignition testing
c. Electronic ignition testing
d. Meter and gauge testing

Provide Practical Application On:

a. Initial set up and test lead connections
b. Testing standard ignition
c. Testing electronic ignition
d. Meter and gauge testing

Related Instruction:

Tasks: RI-01; RI-03; RI-07-08

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (7)
b. Johnson
c. Sun
d. Wetzel

A/Vs:

a. Georgia Transporation Cluster (Slide set STE-3 thru STE-6)
b. Georgia Auto Mechanics Program (Filmloop 223-12A, B; Slide set 223-12)
c. Bergwall, "The Ignition System Explained" (Flimstrip #6)
d. Ford, "Ignition System Diagnosis and Adjustment" (Transp. 2301-203)

Student Manuals:

a. Georgia Transportation Cluster (STE-3, 4, 5, 6)
b. Georgia Auto Mechanics Program (223-12)

Tools and Equipment:

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CLASSROOM HOURS 10

EVALUATION (AS-22)

a. Given an ignition analyzer, operational automotive engine and necessary tools and equipment, the learner will set up and use and test the ignition system. The analyzer recorded readings must be within 5% of actual known values.

b. Johnson, Automotive Diagnosis and Tune-up

c. Wetzel, Automotive Diagnosis and Tune-up

d. Crouse & Anglin, Automotive Tune-up

e. Hughes, Guide to the Automobile Mechanic Certification Exam

f. V'TECS, Automotive Mechanics; Task No. 75

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Hand tools
b. Tune-up ignition analyzer
c. Auto shop repair manual

TASK

AS-23 Diagnosing ignition system problems

PERFORMANCE OBJECTIVE

Develop a troubleshooting plan for locating problems in the ignition system.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Ignition system (conventional)
b. Ignition system (electronic)
c. Instrumentation

Provide Demonstration On:

a. Diagnosing problems in ignition system (conventional)
b. Diagnosing problems in ignition system (electronic)
c. Using instruments to diagnosis ignition system problems

Provide Practical Application On:

a. Diagnosing problems in ignition system (conventional)
b. Diagnosing problems in ignition system (electronic)
c. Using instruments to diagnosis ignition system problems

Related Instruction:

Tasks: RI-01; RI-03-05; RI-07-08; RI-11, RI-14-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (7)
b. Johnson
c. Sun
d. Wetzel

A/Vs:

a. Bergwall, "The Ignition System Explained" (Filmstrip #5)
b. Prentice-Hall "Electrical Ignition Service" (Filmstrip #3), "Electronic Ignition Systems" (Filmstrips #2, 4, 6)

Student Manuals:

Tools and Equipment:

a. Hand tools
b. Tune-up ignition analyzer
c. Hand held meters
d. Auto shop repair manual

CLASSROOM HOURS	4

EVALUATION (AS-23)

a. Given an operational automotive engine with faulty ignition system and necessary tools and equipment, the learner will formulate a troubleshooting plan and locate the problem in double the flat rate time.

b. Johnson, Automotive Diagnosis and Tune-up

c. Wetzel, Automotive Diagnosis and Tune-up

d. Crouse & Anglin, Automotive Tune-up

e. Hughes, Guide to the Automobile Mechanic Certification Exam

f. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Volume I, II

TASK

AS-24 Servicing battery and cables

PERFORMANCE OBJECTIVE

Service battery and connecting cables.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Battery construction
b. Battery maintenance and testing
c. Cable maintenance and testing

Provide Demonstration On:

a. Battery maintenance
b. Battery testing
c. Cable maintenance

Provide Practical Application On:

a. Battery maintenance
b. Testing battery
c. Testing cable

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-08; RI-11; RI-13

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)
b. Wetzel

A/Vs:

a. Georgia's Transporation Cluster (Slide set TSB-1 thru TSB-5)
b. Georgia Auto Mechanics Program (Slide set 201-4A; Filmstrip 201-4B)
c. Prentice-Hall "Basic Automotive Service" (Filmstrip #4) "How the Automobile Works" (Filmstrip #2)

Student Manuals:

a. Georgia Transportation Cluster (Slide set TSB-1 thru TSB-5)
b. Georgia Auto Mechanics Program (201-4)
c. Oklahoma, Auto Mechanics II

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CLASSROOM HOURS 2

EVALUATION (AS-24)

a. Given an operational automotive starting system and necessary tools and equipment, the learner will test and service the battery and cables according to standards in the auto shop repair manual or manufacturer's specifications.

b. Wetzel, Automotive Diagnosis & Tune-up

c. Crouse & Anglin, The Auto Book & Auto Study Guide

d. Hughes, Guide to the Automobile Mechanic Certification Exam

e. Oklahoma, Auto Mechanics II

f. V'TECS, Automotive Mechanics; Task No. 102

g. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Hand tools
b. Hydrometer
c. Volt-ampmeter
d. Battery service tools
e. Auto shop repair manual

TASK

AS-25 Replacing and rebuilding solenoids and switches

PERFORMANCE OBJECTIVE

Replace and/or rebuild starting solenoids and ignition switches.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Solenoids
b. Switches
c. Starter wiring

Provide Demonstration On:

a. Removing and replacing solenoids
b. Rebuilding solenoids
c. Removing and replacing switches

Provide Practical Application On:

a. Remove and replace solenoid
b. Rebuild solenoid
c. Remove and replace switch

Related Instruction:

Tasks: RI-01-03; RI-05; RI-08; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)
b. Johnson
c. Wetzel

A/Vs:

a. Bergwall, "Automotive Starting System Explained" (Filmstrip #2)
b. Georgia Auto Mechanics Program (Slide set 222-5B; Filmstrip 222-5A)

Student Manuals:

a. Georgia Auto Mechanics Program (222-5)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Hand tools
b. Volt-ampmeter
c. Auto shop repair manual
d. Solenoids and switches

CLASSROOM HOURS

4

EVALUATION (AS-25)

a. Given an operational automotive starting system and necessary tools and equipment, the learner will remove and rebuild solenoids and switches according to standards in the auto shop repair manual or manufacturer's specifications.

b. Crouse & Anglin, The Auto Book & Auto Study Guide

c. Wetzel, Automotive Diagnosis and Tune-up

d. Johnson, Automotive Diagnosis and Tune-up

e. Bergwall, filmstrip questions

f. Hughes, Guide to the Automobile Mechanic Certification Exam

g. Oklahoma, Auto Mechanics II

h. V'TECS, Automotive Mechanics, Task No. 90, 91

TASK

AS-26 Removing and replacing starters

PERFORMANCE OBJECTIVE

Remove and replace the starter

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Starter wiring
b. Starter construction

Provide Demonstration On:

Removing and replacing starters

Provide Practical Application On:

Remove and replace starter

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)
b. Wetzel

A/Vs:

a. Georgia Transportation Cluster (Slide set TSM-2)
b. Bergwall, "The Automotive Starting System Explained" (Filmstrip #1)

Student Manuals:

a. Georgia Transportation Cluster (TSM-2)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Hand tools
b. Auto shop repair manual

CLASSROOM HOURS 4

EVALUATION (AS-26)

a. Given an operational automotive starting system and necessary tools and equipment, the learner will remove and replace the starter according to standards of auto shop repair manual or manufacturer's specifications.

b. Crouse & Anglin, The Auto Book & Auto Study Guide

c. Wetzel, Automotive Diagnosis and Tune-up

d. V'TECS, Automotive Mechanics; Task No. 91

e. Oklahoma, Auto Mechanics II

TASK

AS-27 Disassembling and inspecting the starting motor components

PERFORMANCE OBJECTIVE

Disassemble and inspect the starting system components.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Starter circuits
b. Starter operation
c. Instrumentation

Provide Demonstration On:

a. Disassembling starter
b. Test armature and field coils
c. Test commutator
d. Check bushings & brushes

Provide Practical Application On:

a. Disassemble starter
b. Test armature and field coils
c. Test commutator
d. Check bushings & brushes

Related Instruction:

Tasks: RI-01; RI-03; RI-05-06; RI-08; RI-11; RI-14-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)
b. Wetzel

A/Vs:

a. Georgia Transportation Cluster (Slide set TSM-2 and TSM-3)
b. Georgia Auto Mechanics Program (Slide set 222-2; 222-3; 222-4)
c. Bergwall, "The Starting System Explained" (Filmstrip #3)
d. Ford, "Battery and Starting Systems" (Slide set 2700-005)
e. Prentice-Hall, "Servicing Automobile Electric Starters" (Filmstrip #1-4)

Student Manuals:

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CLASSROOM HOURS 4

EVALUATION (AS-27)

a. Given an operational automotive starting system and necessary tools and equipment, the learner will disassemble and inspect the starter components according to standards of the auto shop repair manual and manufacturer's specifications.

b. Crouse & Anglin, The Auto Book & Auto Study Guide

c. Wetzel, Automobile Diagnosis and Tune-up

d. Bergwall, filmstrip questions

e. Hughes, Guide to the Automobile Mechanic Certification Exam

f. V'TECS, Automotive Mechanics; Task No. 92

g. Georgia Student Assessment System, Domain Referenced Tests; Transporation/Automotive Mechanics, Vol. I, II

h. Oklahoma, Auto Mechanics II

INSTRUCTIONAL MATERIALS

Student Manuals

a. Georgia Transportation Cluster (TSM-2; TSM-3)
b. Georgia Auto Mechanics Program (222-2; 222-3; 222-3)
c. Ford, "Battery and Starting System" (2801-001)
d. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Hand tools
b. Armature tester
c. Ohmmeter
d. Auto shop repair manual

TASK

AS-28 Reconditioning the starter components

PERFORMANCE OBJECTIVE

Rebuild the starting motor.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Starter circuits
b. Starter operations
c. Instrumentation

Provide Demonstration On:

a. Replacing bushings
b. Test armature and field coils
c. Turning the commutator
d. Replacing field coils
e. Replacing the brushes

Provide Practical Application On:

a. Complete overhaul of starter
b. Turning commutator
c. Replace field coils
d. Replace bearings and brushes

Related Instruction:

Tasks: RI-01-03; RI-05-06; RI-09; RI-10; RI-13

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)
b. Johnson
c. Wetzel

A/Vs:

a. Georgia Transportation Cluster (Slide set TSM-4)
b. Georgia Auto Mechanics Program (See task AS-27)
c. Bergwall, "The Starting System Explained" (Filmstrip #1, 2, 4)
d. Prentice-Hall, (See task AS-27)

Student Manuals:

a. Georgia Transportation Cluster (TSM-4)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Hand tools
b. Armature tester
c. Armature lathe
d. Ohmmeter
e. Auto shop repair manual

CLASSROOM HOURS 4

EVALUATION (AS-28)

a. Given an operational automotive starter and necessary tools and equipment, the learner will recondition the starter components according to standards of auto shop repair manual and manufacturer's specifications.

b. Crouse & Anglin, The Auto Book & Auto Study Guide

c. Wetzel, Automobile Diagnosis and Tune-up

d. Johnson, Automobile Diagnosis and Tune-up

e. Bergwall, filmstrip questions

f. Hughes, Guide to the Automobile Mechanic Certification Exam

g. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol I, II

h. V'TECS, Automotive Mechanics; Task No. 92

i. Oklahoma, Auto Mechanics II

TASK

AS-29 Reassembling and testing the starter

PERFORMANCE OBJECTIVE

Reassemble and test the starter.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Starter circuits
b. Starter operations
c. Instrumentation

Provide Demonstration On:

a. Reassembling starter
b. Testing starter

Provide Practical Application On:

Reassembling and testing starter

Related Instructions:

Tasks: RI-01; RI-03; RI-05; RI-08; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)
b. Johnson
c. Wetzel

A/Vs:

a. Georgia Transportation Cluster (Slide set TSM-4A & 4B)
b. Bergwall, "The Starting System Explained" (Filmstrip #3, 4)

Student Manuals:

a. Georgia Transportation Cluster (TSM-4)
b. Georgia Auto Mechanics Program (223-2)
c. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Hand tools
b. Volt-ohmmeter
c. Ampmeter
d. Auto shop repair manual

CLASSROOM HOURS 2

EVALUATION (AS-29)

a. Given a tested, disassembled automotive starter and necessary tools and equipment, the learner will reassemble and test the starter according to standards of the auto shop repair manual and manufacturer's specifications.

b. Crouse & Anglin, The Auto Book & Auto Study Guide

c. Wetzel, Automobile Diagnosis and Tune-up

d. Johnson, Automobile Diagnosis and Tune-up

e. Bergwall, filmstrip questions

f. Hughes, Guide to the Automobile Mechanic Certification Exam

g. Oklahoma, Auto Mechanics II

TASK

AS-30 Diagnosing starting problems

PERFORMANCE OBJECTIVE

Develop a troubleshooting plan for locating problems in the starting system.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Starter system
b. Instrumentation

Provide Demonstration On:

a. Diagnosing solenoids and switches
b. Quick diagnosing techniques
c. Using instruments to diagnosis starter system problems

Provide Practical Application On:

a. Diagnosing solenoid
b. Diagnosing switch
c. Diagnosing starter
d. Using instruments to diagnose starter problems

Related Instruction:

Tasks: RI-01; RI-03-05; RI-07-08; RI-10-11; RI-13; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)
b. Johnson
c. Wetzel

A/Vs:

a. Georgia Transportation Cluster (Slide set TSM-1 thru TSM-4)
b. Georgia Auto Mechanics Program (Filmstrip 222-1A, 1B; Slide Set 222-1C)
c. Bergwall, "Starting System Explained" (Filmstrip #1, 2, 3, 4)

Student Manuals:

a. Georgia Auto Mechanics Program (222-1)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Hand tools
b. Volt-ohmmeter
c. Ampmeter
d. VAT 28 or VAT 40 or equal type equipment
e. Auto shop repair manual

CLASSROOM HOURS 4

EVALUATION (AS-30)

a. Given an operational automotive engine with a faulty starting system and necessary tools and equipment, the learner will formulate a troubleshooting plan and locate the problem in double the flat rate time.

b. Crouse & Anglin, The Auto Book & Auto Study Guide

c. Wetzel, Automobile Diagnosis and Tune-up

d. Johnson, Automobile Diagnosis and Tune-up

e. Bergwall, filmstrip questions

f. Hughes, Guide to the Automobile Mechanic Certification Exam

g. V'TECS, Automotive Mechanics; Task No. 77

TASK

AS-31 Testing the DC generator and regulator

PERFORMANCE OBJECTIVE

Test the DC generator and regulator out put.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Charging circuit
b. Generator construction and theory
c. Two types of DC generator circuits
d. Cut-out relay
e. Voltage regulator
f. Current regulator

Provide Demonstration On:

a. Generator out put test
b. Testing A & B type generator circuits
c. Testing cut-out relay
d. Testing voltage and current regulator

Provide Practical Application On:

a. Testing A type generator
b. Testing B type generator
c. Testing cut-out relay
d. Testing voltage regulator
e. Testing current regulator

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-08

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)
b. Wetzel

A/Vs:

a. Georgia Auto Mechanics Program (Film 221-5A; Slide set 221-5B)
b. Prentice-Hall, "How the Automobile Works" (Film-strip #2)

Student Manuals:

a. Georgia Transportation Cluster (TCS-1)
b. Georgia Auto Mechanics Program (221-1, 221-5)
c. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Hand tools
b. Hydrometer
c. Volt-ampmeter
d. Dwell tach
e. Auto shop repair manual

CLASSROOM HOURS

6

EVALUATION (AS-31)

a. Given an operational automotive DC charging system and necessary tools and equipment, the learner will test the DC generator and regulator. Test results must be within 5% of known values.

b. Wetzel, Automobile Diagnosis and Tune-up

c. Crouse & Anglin, Automobile Tune-up

d. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

e. V'TECS, Automotive Mechanics; Task No. 79, 86

f. Oklahoma, Auto Mechanics II

TASK

AS-32 Testing the alternator and regulator

PERFORMANCE OBJECTIVE

Test the alternator and regulator out put.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Comparing alternators and generators
b. Charging circuits
c. Alternator system construction
d. Alternator construction
e. Regulator construction and types

Provide Demonstration On:

a. Testing alternator
b. Testing regulator

Provide Practical Application On:

a. Testing alternator
b. Testing regulator

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-08

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)
b. Johnson
c. Wetzel

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 221-6)
b. Ford, "Charging System-Alternator" (Slide set 3101-010; Trans. 3101)

Student Manuals:

a. Georgia Transportation Cluster (TCS-3, TCS-4)
b. Georgia Auto Mechanics Program (221-6)
c. Ford, "Charging System-Alternator" (3101-010)
d. Oklahoma, Auto Mechanics II

Tools and Equipment:

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CLASSROOM HOURS	6

EVALUATION (AS-32)

a. Given an operational automotive alternator charging system and necessary tools and equipment, the learner will test the alternator and regulator. Test results must be within 5% of known values.

b. Wetzel, Automobile Diagnosis and Tune-up

c. Johnson, Automobile Diagnosis and Tune-up

d. Crouse & Anglin, Automobile Tune-up

e. Hughes, Guide to the Automobile Mechanic Certification Exam

f. Georgia Student Assessment System, Domain Referenced Tests; Transporation/Automotive Mechanics, Vol. I, II

g. V'TECS, Automotive Mechanics; Task No. 79

h. Oklahoma, Auto Mechanics II

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Hand tools
b. VA tester or equal type tester
c. Tach
d. Auto shop repair manual

TASK

AS-33 Removing, disassembling and inspection of the generator

PERFORMANCE OBJECTIVE

Remove, disassemble and inspect the DC generator parts and components.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Generator circuits
b. Generator operation
c. Instrumentation
d. Using the growler

Provide Demonstration On:

a. Disassembling generator
b. Testing armature & field coils
c. Testing commutator
d. Inspecting bearings and brushes

Provide Practical Application On:

a. Disassembling generator
b. Testing armature
c. Testing field coils
d. Testing commutator
e. Inspecting bearings & brushes

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-06; RI-08; RI-11; RI-14

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)
b. Wetzel

Student Manuals:

Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Hand tools
b. Armature tester
c. Ohmmeter
d. Auto shop repair manual

CLASSROOM HOURS 4

EVALUATION (AS-33)

a. Given an operational automotive DC charging system and necessary tools and equipment, the learner will remove, disassemble and inspect the generator according to standards in the auto shop repair manual and manufacturer's specifications.

b. Wetzel, Automobile Diagnosis and Tune-up

c. Crouse & Anglin, Automobile Tune-up

d. Oklahoma, Auto Mechanics II

TASK

AS-34 Rebuilding the generator

PERFORMANCE OBJECTIVE

Overhaul a DC generator.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Generator circuits
b. Generator operation
c. Instrumentation

Provide Demonstration On:

a. Replacing bushings or bearings
b. Testing armature and field coils
c. Turning the commutator
d. Replacing field coils
e. Replacing brushes

Provide Practical Application On:

a. Replacing bushings or bearings
b. Testing armature & field coils
c. Turning commutator
d. Replacing field coils
e. Replacing brushes

Related Instruction:

Tasks: RI-01-03; RI-05; RI-08; RI-11; RI-13

INSTRUCTIONAL MATERIALS

Testbooks:

a. Crouse & Anglin (1)
b. Wetzel

A/Vs:

Georgia Auto Mechanics Program (Slide set 221-2, 221-3, 221-4A & B)

Student Manuals:

a. Georgia Auto Mechanics Program (221-2, 3, 4)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Hand tools
b. Armature tester
c. Armature lathe
d. Ohmmeter
e. Auto shop repair manual

CLASSROOM HOURS

4

EVALUATION (AS-34)

a. Given an operational automotive DC generator and necessary tools and equipment, the learner will rebuild the generator according to standards of auto shop repair manual and manufacturer's specifications.

b. Wetzel, Automobile Diagnosis and Tune-up

c. Crouse & Anglin, Automobile Tune-up

d. V'TECS, Automotive Mechanics; Task No. 87

e. Oklahoma, Auto Mechanics II

TASK

AS-35 Removing, disassembling and inspection of the alternator

PERFORMANCE OBJECTIVE

Remove, disassemble and inspect the alternator parts and components.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Alternator circuits
b. Alternator construction
c. Instrumentation

Provide Demonstration On:

a. Removing alternator
b. Disassemble alternator
c. Testing stator
d. Testing rotor
e. Testing diodes
f. Checking bearings & brushes

Provide Practical Application On:

a. Removing alternator
b. Disassembling alternator
c. Testing stator
d. Testing rotor
e. Testing diodes
f. Checking bearings & brushes

Related Instruction:

Tasks: RI-01; RI-03; RI-05-06; RI-08; RI-11; RI-14

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)
b. Johnson
c. Wetzel

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 221-7, 221-8, 221-9A, 261-3A,B, 261-4B; Filmstrip 221-9B, 261-4A)
b. Ford, "Charging System Alternator" (Transp. 3101-207)
c. Prentice-Hall, "Electrical Ignition Service" (Filmstrip #4)

Student Manuals:

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CLASSROOM HOURS	4

EVALUATION (AS-35)

a. Given an inoperative automotive alternator charging system and necessary tools and equipment, the learner will remove, disassemble and inspect the alternator. The problem(s) must be located in double the flat rate time.

b. Wetzel, Automobile Diagnosis and Tune-up

c. Johnson, Automobile Diagnosis and Tune-up

d. Crouse & Anglin, Automobile Tune-up

e. Hughes, Guide to the Automobile Mechanic Certification Exam

f. V'TECS, Automotive Mechanics; Task No. 87

g. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

h. Oklahoma, Auto Mechanics II

INSTRUCTIONAL MATERIALS

Student Manuals:

a. Georgia Transportation Cluster (TCS-5, TCS-6, TCS-7, TCS-8, TCS-9)
b. Georgia Auto Mechanics Program (221-7, 8, 9; 261-4)
c. Ford, "Charging System Alternator" (3101-106)
d. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Hand tools
b. Ohmmeter
c. Diode tester
d. Auto shop repair manual

TASK

AS-36 Rebuilding the alternator

PERFORMANCE OBJECTIVE

Overhaul alternator, replace defective parts and perform a bench test to insure alternator is functioning properly.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Alternator circuits
b. Alternator construction
c. Diode placement
d. Instrumentation

Provide Demonstration On:

a. Removing and replacing rotor
b. Removing and replacing stator
c. Removing and replacing diodes
d. Removing and replacing brushes & bearings
e. Resurfacing slip rings

Provide Practical Application On:

a. Remove & replace rotor
b. Remove & replace stator
c. Remove & replace diodes
d. Remove & replace brushes & bearings
e. Resurface slip rings

Related Instruction:

Tasks: RI-01-03; RI-05; RI-08; RI-11; RI-13

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)
b. Johnson
c. Wetzel

A/Vs:

(See task AS-35)

Student Manuals:

a. Georgia Transportation Cluster (TS-10)
b. (See task AS-35)

Tools and Equipment:

a. Hand tools
b. Diode press
c. Bearing press
d. Auto shop repair manual

CLASSROOM HOURS 4

EVALUATION (AS-36)

a. Given an operational automotive alternator charging system (live or trainer) and necessary tools and equipment, the learner will rebuild the alternator. The alternator out put must be within 5% of manufacturer's specifications.

b. Wetzel, Automobile Diagnosis and Tune-up

c. Johnson, Automobile Diagnosis and Tune-up

d. Crouse & Anglin, Automobile Tune-up

e. Bergwall, filmstrip questions

f. Hughes, Guide to the Automobile Mechanic Certification Exam

g. Also see Task No. AS-35

TASK

AS-37 Removing and replacing generators and alternators

PERFORMANCE OBJECTIVE

Remove and replace the generator or alternator.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Generator circuits
b. Alternator circuits
c. Hook-ups
d. Drive belts

Provide Demonstration On:

a. Polarizing A & B type generators
b. Installing generator
c. Installing alternator

Provide Practical Application On:

a. Removing and installing generator
b. Polarize A & B type generator
c. Removing and installing alternator

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-08; RI-11; RI-14

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)
b. Johnson
c. Wetzel

Tools and Equipment:

a. Hand tools
b. Belt tension tool

Student Manuals:

Oklahoma, Auto Mechanics II

CLASSROOM HOURS

2

EVALUATION (AS-37)

a. Given an operational automotive charging system (generator or alternator type) and necessary tools and equipment, the learner will remove and replace the generator or alternator according to standards of auto shop repair manual and manufacturer's specifications.

b. Wetzel, Automobile Diagnosis and Tune-up

c. Johnson, Automobile Diagnosis and Tune-up

d. Crouse & Anglin, Automobile Tune-up

e. Hughes, Guide to the Automobile Mechanic Certification Exam

f. V'TECS, Automotive Mechanics; Task No. 98

g. Oklahoma, Auto Mechanics II

TASK

AS-38 Diagnosing charging system problems

PERFORMANCE OBJECTIVE

Develop a troubleshooting plan for locating problems in the charging system.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Generator circuits
b. Alternator circuits
c. Instrumentation

Provide Demonstration On:

a. Diagnosing generator problems
b. Diagnosing alternator problems
c. Diagnosing regulator problems
d. Diagnosing wiring problems

Provide Practical Application On:

a. Diagnosing generator problems
b. Diagnosing alternator problems
c. Diagnosing regulator problems
d. Diagnosing wiring problems

Related Instruction:

Tasks: RI-01; RI-03-05; RI-07-08; RI-10-11; RI-13; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)
b. Johnson
c. Wetzel

A/Vs:

Ford, "Charging System Diagnosis" (Filmstrip 3101-209)

Student Manuals:

a. Ford, "Charging System Diagnosis" (3101-209)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Hand tools
b. Volt ohmmeter
c. VA tester or equal tester
d. Tach
e. Auto shop repair manual

CLASSROOM HOURS

4

EVALUATION (AS-38)

a. Given an operational automotive engine with faulty charging system and necessary tools and equipment, the learner will develop a troubleshooting plan and locate the problem in double the flat rate time.

b. Wetzel, Automobile Diagnosis and Tune-up

c. Johnson, Automobile Diagnosis and Tune-up

d. Crouse & Anglin, Automoblie Tune-up

e. Hughes, Guide to the Automobile Mechanic Certification Exam

f. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

g. Oklahoma, Auto Mechanics II

TASK

AS-39 Checking coolant level and freezing point

PERFORMANCE OBJECTIVE

Check and replace coolant.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Cooling system function
b. Protection of cooling system
c. Engine coolant
d. Tester use

Provide Demonstration On:

a. Checking coolant level in radiator
b. Checking coolant level in expansion tank
c. Checking freezing point

Provide Practical Application On:

a. Checking coolant level in radiator
b. Checking coolant level in expansion tank
c. Checking freezing point with approved tester

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-07; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Stockel (1)
b. Toboldt & Johnson
c. Wetzel

A/Vs:

a. Georgia Transportation Cluster (Slide set SCS-2)
b. Georgia Auto Mechanics Program (Slide set 212-1)
c. Bergwall, "The Automotive Cooling System Explained" (Filmstrip #1 & 5) and "How to Service the Cooling System" (Filmstrip #423)
d. Ford, "Cooling System Principles of Operation" (Slide set 2700-005)
e. Prentice-Hall, "How the Automobile Works" (Filmstrip #3)

Student Manuals:

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CLASSROOM HOURS

2

EVALUATION (AS-39)

a. Given an operational automotive cooling system (live or trainer) and necessary tools and equipment, the learner will check the coolant level and restore freezing point to 34° F.

b. Toboldt & Johnson, Automotive Encyclopedia

c. Bergwall, filmstrip questions

d. Hughes, Guide to the Automobile Mechanic Certification Exam

e. V'TECS, Automotive Mechanics; Task No. 126, 127

f. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

g. Oklahoma, Auto Mechanics I

INSTRUCTIONAL MATERIALS

Student Manuals:

a. Georgia Transportation Cluster (SCS-1)
b. Georgia Auto Mechanics Program (212-1)
c. Ford, "Cooling System Principles of Operation" (2700-005)
d. Oklahoma, Auto Mechanics I

Tools and Equipment:

a. Hand tools
b. Anti-freeze tester
c. Auto shop repair manual

TASK

AS-40 Cleaning and flushing the system

PERFORMANCE OBJECTIVE

Clean and flush the cooling system.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Cooling system construction
b. Cleaning solutions
c. Flushing procedures

Provide Demonstration On:

a. Using cleaning solution
b. Using flushing equipmen
c. Cleaning system
d. Flushing system

Provide Practical Application On:

Cleaning and flushing system

Related Instruction:

Tasks: RI-01; RI-03; RI-05

INSTRUCTIONAL MATERIALS

Textbooks:

a. Stockel
b. Toboldt & Johnson
c. Wetzel

A/Vs:

a. Georgia Transportation Cluster (Slide set SCS-2)
b. Bergwall, "Auto Cooling System Explained" (Filmstrip #4)

Student Manuals:

a. Georgia Transportation Cluster (SCS-2)
b. Oklahoma, Auto Mechanics I

Tools and Equipment:

a. Hand tools
b. Cleaning solutions
c. Flushing solutions
d. Auto shop repair manual

CLASSROOM HOURS

4

EVALUATION (AS-40)

a. Given an operational automotive cooling system and necessary tools and equipment, the learner will clean and flush the system to standards of the auto shop repair manual.

b. Bergwall, filmstrip questions

c. Hughes, Guide to the Automobile Mechanic Certification Exam

d. Oklahoma, Auto Mechanics I

e. V'TECS, Automotive Mechanics; Task No. 129

TASK

AS-41 Inspecting, adjusting or replacing fan belts and hoses

PERFORMANCE OBJECTIVE

Inspect, adjust or replace fan belts and hoses.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Belt construction and use
b. Hose construction and use

Provide Demonstration On:

a. Inspecting belts and hoses
b. Adjusting belts
c. Replacing belts and hoses

Provide Practical Application On:

Inspecting and replacing water pump drive belts and radiator and heater hoses

Related Instruction:

Tasks: RI-01-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Stockel (1)
b. Toboldt & Johnson
c. Wetzel

A/Vs:

a. Bergwall, "Auto Cooling System Explained" (Filmstrip #2)
b. Prentice-Hall, "Working with Hoses" (Filmstrip)

Student Manuals:

a. Georgia Transportation Cluster (SCS-3; SCS-6)
b. Oklahoma, *Auto Mechanics I*

Tools and Equipment:

a. Hand tools
b. Belt tension gauge
c. Auto shop repair manual

CLASSROOM HOURS	4

EVALUATION (AS-41)

a. Given an operational automotive engine and necessary tools and equipment, the learner will inspect, adjust or replace fan belts and hoses. Hose connections must hold 20 psi pressure and no leaks. Belts must be tensioned to within 5% of manufacturer's specifications.

b. Bergwall, filmstrip questions

c. Hughes, Guide to the Automobile Mechanic Certification Exam

d. Toboldt & Johnson, Automotive Encyclopedia

e. V'TECS, Automotive Mechanics; Task No. 130, 135, 136

f. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Auto Mechanics, Volume I, II

g. Oklahoma, Auto Mechanics I

TASK

AS-42 Testing system with pressure

PERFORMANCE OBJECTIVE

Pressure test cooling system.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Cooling system construction
b. Pressure tester

Provide Demonstration On:

a. Using pressure tester
b. Pressure testing cooling system
c. Pressure testing radiator cap

Provide Practical Application On:

Pressure test cooling system

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-07

INSTRUCTIONAL MATERIALS

Textbooks:

a. Stockel (1)
b. Toboldt & Johnson
c. Wetzel

A/Vs:

Georgia Transportation Cluster (Slide set SCS-2)

Student Manuals:

a. Georgia Transportation Cluster (SCS-2)
b. Oklahoma, Auto Mechanics I

Tools and Equipment:

a. Hand tools
b. Pressure tools
c. Auto shop repair manual

CLASSROOM HOURS 2

EVALUATION (AS-42)

a. Given an operational automotive engine (live or trainer) and necessary tools and equipment, the learner will test cooling system with correct pressure and observe and record any noticable leaks.

b. Hughes, Guide to the Automobile Mechanic Certification Exam

c. Toboldt & Johnson, Automotive Encyclopedia

d. V'TECS, Automotive Mechanics; Task No. 132

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Auto Mechanics, Vol. I, II

f. Oklahoma, Auto Mechanics I

TASK

AS-43 Removing, repairing and replacing the radiator

PERFORMANCE OBJECTIVE

Remove, repair and replace the radiator.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Radiator construction
b. Repair procedures
c. Radiator specialists

Provide Demonstration On:

a. Removing radiator
b. Repairing tank leaks
c. Repairing tube leaks
d. Checking transmission coder
e. Replacing radiator

Provide Practical Application On:

a. Removing radiator and soldering punctures and seams
b. Make a determination on whether to send to radiator shop for repairs

Related Instruction:

Tasks: RI-01-03; RI-05; RI-11; RI-13

INSTRUCTIONAL MATERIALS

Textbooks:

a. Stockel (2)
b. Toboldt & Johnson
c. Wetzel

A/Vs:

a. Georgia Transportation Cluster (Slide set SCS-4)
b. Bergwall, "Auto Cooling System Explained" (Filmstrip #1, 2, 3, 4)

Student Manuals:

a. Georgia Transportation Cluster (SCS-4)
b. Oklahoma, Auto Mechanics I

Tools and Equipment:

a. Hand tools
b. Soldering torch, flux and solder
c. Tube rods
d. Pressure adaptor for transmission coder
e. Auto shop repair manual

CLASSROOM HOURS

6

EVALUATION (AS-43)

a. Given an operational automotive cooling system (live or trainer) and necessary tools and equipment, the learner will remove, repair and replace the radiator. When pressure tested the radiator will show no sign of water leakage.

b. Bergwall, filmstrip questions

c. Hughes, Guide to the Automobile Mechanic Certification Exam

d. Toboldt & Johnson, Automotive Encyclopedia

e. Oklahoma, Auto Mechanics I

f. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Auto Mechanics, Vol, I, II

g. V'TECS, Automotive Mechanics; Task No. 129, 133, 139

TASK

AS-44 Testing and replacing thermostats and radiator caps

PERFORMANCE OBJECTIVE

Test and replace thermostats and radiator caps.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Thermostat construction and function
b. Radiator cap construction and function

Provide Demonstration On:

a. Testing thermostat
b. Replacing thermostat
c. Testing radiator cap
d. Replacing radiator cap

Provide Practical Application On:

Test, remove and replace thermostats and radiator caps

Related Instruction:

Tasks: RI-01-03; RI-05; RI-07; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Stockel (2)
b. Toboldt & Johnson
c. Wetzel

A/Vs:

a. Georgia Transportation Cluster (Slide set SCS-2)
b. Bergwall, "Auto Cooling System Explained" (Filmstrip #1, 3, 4)

Student Manuals:

a. Georgia Transportation Cluster (SCS-5)
b. Oklahoma, Auto Mechanics I

Tools and Equipment:

a. Hand tools
b. Pressure tester
c. Thermostat
d. Auto shop repair manual

CLASSROOM HOURS 4

EVALUATION (AS-44)

a. Given an operational automotive cooling system (live or trainer) and necessary tools and equipment, the learner will test and replace the thermostat and radiator cap. Test results must be within 10% of known values.

b. Bergwall, filmstrip questions

c. Hughes, Guide to the Automoblie Mechanic Certification Exam

d. Toboldt & Johnson, Automotive Encyclopedia

e. Oklahoma, Auto Mechanics I

f. V'TECS, Automotive Mechanics; Task No. 140, 141

g. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Auto Mechanics, Vol. I, II

TASK

AS-45 Replacing the variable speed fan

PERFORMANCE OBJECTIVE

Inspect, remove and replace the variable speed fan.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Variable speed fan construction
b. Variable speed fan function

Provide Demonstration On:

a. Checking variable speed fan
b. Replacing variable speed fan

Provide Practical Application On:

Checking and replacing variable speed fan

Related Instruction:

Tasks: RI-01-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Stockel (2)
b. Toboldt & Johnson
c. Wetzel

A/Vs:

Bergwall, "The Auto Cooling System Explained" (Filmstrip #2)

Student Manuals:

a. Georgia Transportation Cluster (SCS-7)
b. Oklahoma, Auto Mechanics I

Tools and Equipment:

a. Hand tools
b. Auto shop repair manual

CLASSROOM HOURS 2

EVALUATION (AS-45)

a. Given an operational automotive cooling system and necessary tools and equipment, the learner will inspect, remove and replace the variable speed fan to standards in the auto shop repair manual.

b. Bergwall, filmstrip questions

c. Hughes, Guide to the Automobile Mechanic Certification Exam

d. Toboldt & Johnson, Automotive Encyclopedia

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation'Auto Mechanics, Vol. I, II

f. V'TECS, Automotive Mechanics; Task No. 137

g. Oklahoma, Auto Mechanics I

TASK

AS-46 Replacing the water pump

PERFORMANCE OBJECTIVE

Inspect, remove and replace the water pump.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Water pump construction
b. Water pump function

Provide Demonstration On:

a. Checking water pump
b. Replacing water pump

Provide Practical Application On:

Checking, removing and replacing the water pump

Related Instruction:

Tasks: RI-01-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Stockel (2)
b. Toboldt & Johnson
c. Wetzel

A/Vs:

Bergwall, "The Auto Cooling System Explained" (Filmstrip #2, 5)

Student Manuals:

a. Georgia Transportation Cluster (SCS-7)
b. Oklahoma, Auto Mechanics I

Tools and Equipment:

a. Hand tools
b. Coolant drain container
c. Auto shop repair manual

CLASSROOM HOURS 4

EVALUATION (AS-46)

a. Given an operational automotive cooling system and necessary tools and equipment, the learner will replace the water pump. Upon completion the pump must turn freely and show no signs of water leakage.

b. Bergwall, filmstrip questions

c. Hughes, Guide to the Automobile Mechanic Certification Exam

d. Toboldt & Johnson, Automotive Encyclopedia

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Auto Mechanics, Vol. I, II

f. V'TECS, Automotive Mechanics; Task No. 138

g. Oklahoma, Auto Mechanics I

TASK

AS-47 Repairing the heater controls

PERFORMANCE OBJECTIVE

Inspect and repair the heater controls.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Control construction (manual)
b. Control construction (automatic)
c. Control function (manual)
d. Control function (automatic)

Provide Demonstration On:

a. Repairing manual heater control
b. Repairing automatic heater controls

Provide Practical Application On:

Inspect and repair manual and automatic heater controls

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Stockel (2)
b. Toboldt & Johnson
c. Wetzel

A/Vs:

Student Manuals:

Oklahoma, Auto Mechanics I

Tools and Equipment:

a. Hand tools
b. Test light
c. Thermometer
d. Auto shop repair manual

CLASSROOM HOURS

2

EVALUATION (AS-47)

a. Given an operational automotive cooling system with operational heater system and necessary tools and equipment, the learner will repair the heater controls to operate within manufacturer's specifications.

b. Toboldt & Johnson, Automotive Encyclopedia

c. Hughes, Guide to the Automobile Mechanic Certification Exam

d. V'TECS, Automotive Mechanics; Task No. 225, 228

e. Oklahoma, Auto Mechanics I

TASK

AS-48 Removing, repairing and replacing the heater core

PERFORMANCE OBJECTIVE

Remove, repair and replace the heater core.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Heater core construction
b. Repair procedures

Provide Demonstration On:

a. Removing heater core
b. Repairing heater core
c. Replacing heater core

Provide Practical Application On:

Removing, repairing and replacing heater core

Related Instruction:

Tasks: RI-01-03; RI-05; RI-11; RI-13

INSTRUCTIONAL MATERIALS

Textbooks:

a. Stockel (2)
b. Toboldt & Johnson
c. Wetzel

A/Vs:

Bergwall, "Auto Cooling System Explained" (Filmstrip #1, 2)

Student Manuals:

Oklahoma, Auto Mechanics I

Tools and Equipment:

a. Hand tools
b. Soldering and/or torch, flux and solder
c. Pressure adaptor fuel leak test
d. Auto shop repair manual

CLASSROOM HOURS

4

EVALUATION (AS-48)

a. Given an operational automotive cooling system with operational heater system and necessary tools and equipment, the learner will remove, repair and replace the heater core. Upon completion the heater core must show no sign of leakage.

b. Toboldt & Johnson, Automotive Encyclopedia

c. Hughes, Guide to the Automobile Mechanic Certification Exam

d. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

e. Oklahoma, Auto Mechanics I

f. V'TECS, Automotive Mechanics; Task No. 224, 226, 227

TASK

AS-49 Diagnosing engine heating and cooling system problems

PERFORMANCE OBJECTIVE

Develop a troubleshooting plan for locating problems in the charging system.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Cooling system construction
b. Cooling system function
c. Cooling system operation
d. Heater function and operation

Provide Demonstration On:

Diagnosing problems in heating and cooling system

Provide Practical Application On:

Diagnosing problems in cooling and heating system

Related Instruction:

Tasks: RI-01; RI-03-05; RI-07; RI-11; RI-13; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Stockel (2)
b. Toboldt & Johnson
c. Wetzel

A/Vs:

a. Georgia Transportation Cluster (Slide set SCS-2, 4)
b. Bergwall, "Auto Cooling System Explained" (Filmstrip #1 thru 5)

Student Manuals:

a. Georgia Transportation Cluster (SCS-2; SCS-4)
b. Oklahoma, Auto Mechanics I

Tools and Equipment:

a. Hand tools
b. Anti-freeze hydrometer
c. Pressure tester
d. Tension gauge
e. Auto shop repair manual
f. Thermometer

CLASSROOM HOURS 4

EVALUATION (AS-49)

a. Given an operational automtoive engine with inoperative cooling system and necessary tools and equipment, the learner will develop a troubleshooting plan and locate the problem in double the flat rate time.

b. Toboldt & Johnson, Automotive Encyclopedia

c. Bergwall, filmstrip questions

d. Hughes, Guide to the Automobile Mechanic Certification Exam

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

f. V'TECS, Auto Mechanics; Task No. 223

g. Oklahoma, Auto Mechanics I

TASK

AS-50 Identifying brake system components

PERFORMANCE OBJECTIVE

Identify the component parts of the drum and disc brake system.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Principles of friction
b. Principles of hydraulics
c. Brake action
d. Brake system components
e. Drum brakes v/s disc brakes
f. Safe working conditions

Provide Demonstration On:

a. Friction principles
b. Hydraulic principles
c. Various brake system designs
d. Brake park application

Provide Practical Application On:

Removing wheels and brake drums and identifying brake system components

Related Instruction:

Tasks: RI-01; RI-03; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)
b. Remling (2)
c. Stockel (1), (2)
d. Toboldt & Johnson

A/Vs:

a. Georgia Auto Mechanics (Slide Set 231-1-A & B)
b. Georgia Transportation Cluster (Slide Set HB-1)
c. Ford, "Evolution of Brakes" (Filmstrip)
d. Automated training
e. Prentice-Hall media

Student Manuals:

a. Georgia Transporation Cluster (HB-1)
b. Georgia Auto Mechanics Program (231-1)
c. MAVCC, Braking Systems
d. Oklahoma, Auto Mechanics I

continued on back

CLASSROOM HOURS

4

EVALUATION (AS-50)

a. Given an automotive chassis, the learner will remove the wheels and brake drums and identify the component parts of the drum and disc brake system. Identification must be 100% correct.

b. Use questions found at end of chapters in either of the textbooks.

c. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Automotive chassis
b. Shop manual
c. Assorted brake tools
d. Assorted hand tools

TASK

AS-51 Adjusting brakes

PERFORMANCE OBJECTIVE

Adjust brakes to specifications.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Types of adjustments
b. Self-adjusting brakes
c. Brake adjustment tools
d. Jack or lift safety
e. Using jack stands

Provide Demonstration On:

a. Pre-adjusting of self adjusting brakes
b. Adjusting regular brakes

Provide Practical Application On:

a. Raising vehicle in preparation of brake adjustment
b. Adjusting brakes

Related Instruction:

Tasks: RI-01; RI-03

INSTRUCTIONAL MATERIALS

Textbooks:

a. Remling (2)
b. Stockel (1)(2)
c. Toboldt & Johnson

A/Vs:

a. Georgia Transportation Cluster (Slide set HB-1)
b. Georgia Auto Mechanics Program (Slide set 231-1-A,B)

Student Manuals:

a. Georgia Transportation Cluster (HB-1)
b. Georgia Auto Mechanics Program (231-1)
c. MAVCC, Braking Systems
d. Oklahoma, Auto Mechanics I

Tools and Equipment:

continued on back

CLASSROOM HOURS	2

EVALUATION (AS-51)

a. Given a vehicle, the learner will raise vehicle in a safe manner, place it on safety stands and adjust brakes to manufacturer's specifications.

b. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

c. V'TECS Automotive Mechanics, Task No. 160-162.

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Automotive chassis with drum brakes
b. Shop manual
c. Brake adjusting tool
d. Brake adjusting gauge

TASK

AS-52 Removing and rebuilding brake cylinders

PERFORMANCE OBJECTIVE

Inspect and rebuild master and wheel cylinders.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Master and wheel cylinder components
b. Basic component removal procedures
c. Cylinder honing and inspection
d. Brake bleeding
e. Single and dual master cylinder
f. Brake lines

Provide Demonstration On:

a. Cylinder removal
b. Cylinder honing
c. Cylinder inspection
d. Brake bleeding
e. Reassembly procedures

Provide Practical Application On:

a. Removing a master cylinder, disassembling, inspecting, identifying parts and rebuilding
b. Removing a wheel cylinder, disassembling, inspecting, identifying parts and rebuilding

Related Instruction:

Tasks: RI-01-03; RI-05; RI-11; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)
b. Remling (2)
c. Stockel (1)(2)
d. Toboldt & Johnson

A/Vs:

a. Georgia Transportation Cluster (Slide set HB-3, 7; 2a, b)
b. Georgia Auto Mechanics Program (Slide set 231-2, 231-4, 231-9)
c. Automated Training, Inc.
d. Prentice-Hall Media

Student Manuals:

a. Georgia Transportation Cluster (HB-3, 7, 2a, b)
b. Georgia Auto Mechanics 231-2, 231-4, 231-9)
c. MAVCC, Braking System
d. Oklahoma, Auto Mechanics I

continued on back

CLASSROOM HOURS

8

EVALUATION (AS-52)

a. Given a vehicle, the learner will remove a master and wheel cylinder, disassemble, hone and inspect. Reassemble with new parts and bleed system. System must be free of air and no leaks.

b. Questions at end of chapters in the textbooks.

c. V'TECS Automotive Mechanics, Task No. 163, 187, 190, 196, 197.

d. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Automotive chassis with drum brakes
b. Shop manual
c. Assorted hand tools
d. Brake cylinder hone
e. Brake cylinder parts kit (master or wheel)
f. Brake bleeder kit
g. Electric drill

TASK

AS-53 Removing and rebuilding brake calipers

PERFORMANCE OBJECTIVE

Inspect and rebuild disc brake calipers.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Caliper types and applications
b. Caliper removal procedures
c. Caliper disassembly and inspection
d. Caliper reassembly and installation
e. Brake pad installation
f. Brake bleeding
g. Torque specifications

Provide Demonstration On:

a. Caliper removal
b. Honing and inspection
c. Reassembly procedures
d. Brake pad installation
e. Brake bleeding
f. Torquing caliper bolts

Provide Practical Application On:

Removing and rebuilding brake calipers

Related Instruction:

continued on back

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)
b. Remling (2)
c. Stockel (1)(2)
d. Toboldt & Johnson

A/Vs:

Prentice-Hall Media

Student Manuals:

a. MAVCC, Braking System
b. Oklahoma, Auto Mechanics I

Tools and Equipment:

continued on back

CLASSROOM HOURS

6

EVALUATION (AS-53)

a. Given a vehicle with disc brakes, the learner will remove, disassemble, hone and inspect a caliper assembly. Reassemble caliper with new parts and bleed system. System must be free of air and no leaks.

b. Use questions at end of chapters in the textbooks.

c. V'TECS, Automotive Mechanics; Task No. 177, 186

d. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

INSTRUCTIONAL ACTIVITIES

Related Instruction:

Tasks: RI-01-03; RI-05; RI-11; RI-15

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Automotive chassis with disc brakes
b. Shop manual
c. Assorted hand tools
d. Brake caliper tool
e. Brake hone
f. Electric drill
g. Parts kit (caliper)
h. Brake bleeder kit
i. Torque wrench
j. Brake caliper removal tool

TASK

AS-54 Replacing brake shoes and pads

PERFORMANCE OBJECTIVE

Inspect, remove and replace brake shoes and disc pads.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Drum brake component parts from the rear wheels
b. Types of linings
c. Brake springs
d. Self-adjusting brake types
e. Initial adjustment
f. Disc brake pad replacement
g. Service front wheel bearings

Provide Demonstration On:

a. Shoe replacement procedures
b. Disc brake pad replacement procedures
c. Initial adjustments
d. Repack front wheel bearings

Provide Practical Application On:

a. Removing and replacing brake shoes
b. Removing and replacing disc brake pads

Related Instruction:

Tasks: RI-01-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)
b. Remling (2)
c. Stockel (1)(2)
d. Toboldt & Johnson

A/Vs:

a. Georgia Transportation Cluster (Slide set HB-5, 6, 9)
b. Georgia Auto Mechanics Program (Slide set 231-6, 231-7, 231-12)
c. Prentice-Hall Media

Student Manuals:

a. Georgia Transportation Cluster (HB-5, 6, 9)
b. Georgia Auto Mechanics Program (231-6, 231-7, 231-12)
c. MAVCC, Braking Systems
d. Oklahoma, Auto Mechanics I

Tools and Equipment:

continued on back

CLASSROOM HOURS

4

EVALUATION (AS-54)

a. Given a vehicle with drum and disc brakes, the learner will remove the shoes and pads and replace them. The braking action must be smooth, noiseless and not pull to left or right.

b. Questions at end of chapter in the textbooks.

c. V'TECS Automotive Mechanics, Task No. 173, 179, 182, 183, 192.

d. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Automotive chassis drum or disc brakes
b. Shop manual
c. Assorted hand tools
d. Assorted brake tools
e. Replacement shoes or pads
f. Torque wrench

TASK

AS-55 Machine brake drums

PERFORMANCE OBJECTIVE

Machine a brake drum and make a determination if it is within limits of the manufacturer's specifications.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Safety
b. Types of drums and adapters
c. Drum inspection (defects)
d. Drum mounting on lathe
e. Measuring drums
f. Drum grinding

Provide Demonstration On:

a. Machine operation
b. Drum mounting procedure
c. Type of cuts
d. Use of micrometer
e. Grinding operation

Provide Practical Application On:

Machining both front and rear brake drums

Related Instruction:

Tasks: RI-01; RI-03; RI-05-06; RI-14

INSTRUCTIONAL MATERIALS

Textbooks:

a. Remling (2)
b. Toboldt & Johnson

A/Vs:

a. Georgia Transportation Cluster (Slide set HB-8)
b. Georgia Auto Mechanics Program (Slide set 231-5)
c. Automated Training, Inc.

Student Manuals:

a. Georgia Transportation Cluster (HB-8)
b. Georgia Auto Mechanics Program (231-5)
c. MAVCC, Braking Systems
d. Oklahoma, Auto Mechanics I

Tools and Equipment:

continued on back

CLASSROOM HOURS

4

EVALUATION (AS-55)

a. Given front and rear brake drums, the learner will machine drums. The drums must be smooth and within manufacturer's limits.

b. Use questions from Remling.

c. V'TECS Automotive Mechanics, Task No. 167.

d. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Front and rear brake drums
b. Brake drum machine
c. Brake drum micrometer

TASK

AS-56 Machining brake rotors

PERFORMANCE OBJECTIVE

Machine a disc brake rotor and make a determination if it is within limits of the manufacturer's specifications.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Types of rotors and adapters
b. Mounting rotor on lathe
c. Machining limits
d. Rotor thickness and variation

Provide Demonstration On:

a. Machine operation
b. Rotor mounting procedure
c. Identifying limits
d. Grinding operation
e. Measuring rotor

Provide Practical Application On:

Machining a disc brake rotor

Related Instruction:

Tasks: RI-01-03; RI-05-06; RI-14

INSTRUCTIONAL MATERIALS

Textbooks:

Remling (2)

A/Vs:

a. Georgia Transportation Cluster (Slide set HB-11)
b. Automated Training, Inc.

Student Manuals:

a. Georgia Transportation Cluster (HB-11)
b. MAVCC, Braking Systems
c. Oklahoma, Auto Mechanics I

Tools and Equipment:

a. Disc brake rotor
b. Disc brake machine
c. Micrometer

CLASSROOM HOURS 4

EVALUATION (AS-56)

a. Given a disc brake rotor, the learner will machine the rotor. The rotor must be smooth and within manufacturer's limits.

b. Use questions from Remling

c. V'TECS, Automotive Mechanics; Task No. 166

d. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

TASK

AS-57 Replacing hydraulic control valves and lines

PERFORMANCE OBJECTIVE

Replace hydraulic control valves and lines.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Types of control valves
b. Control valve application
c. Identifying valve function and location
d. Types of special tools needed
e. Lines and hoses

Provide Demonstration On:

a. Valve replacement procedure
b. Valve identification
c. Valve location
d. Flaring metal lines

Provide Practical Application On:

Replacing a hydraulic control valve, line and a flexible hose

Related Instruction:

Tasks: RI-01-03; RI-05; RI-11; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)
b. Remling (2)
c. Stockel (1)(2)
d. Toboldt & Johnson

A/Vs:

Georgia Auto Mechanics Program (Slide set 102-4)

Student Manuals:

a. Georgia Auto Mechanics Program (102-4)
b. MAVCC, Braking Systems
c. Oklahoma, Auto Mechanics I

Tools and Equipment:

continued on back

CLASSROOM HOURS

4

EVALUATION (AS-57)

a. Given a vehicle equipped with a hydraulic control valve and lines, the learner will remove and replace the valve and the steel lines. The system must operate without leaks.

b. Questions at end of unit in Remling textbook.

c. V'TECS, Automotive Mechanics; Task No. 177, 193

d. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Automotive chassis
b. Shop manual
c. Assorted hand tools
d. Line wrench set
e. Double flaring tool set

TASK

AS-58 Replacing power brake units

PERFORMANCE OBJECTIVE

Replace a power brake unit.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Types of power brake units
b. Power booster operation
c. Power booster application
d. Booster failure diagnosis
e. Booster component part identification

Provide Demonstration On:

a. Replacement procedures
b. Diagnosis procedures

Provide Practical Application On:

Replacing a power booster unit

Related Instruction:

Tasks: RI-01-03; RI-05; RI-11; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)
b. Remling (2)
c. Stockel (1)(2)
d. Toboldt & Johnson

A/Vs:

Student Manuals:

a. Georgia Auto Mechanics Program (231-13)
b. MAVCC, Braking Systems
c. Oklahoma, Auto Mechanics I

Tools and Equipment:

continued on back

CLASSROOM HOURS 4

EVALUATION (AS-58)

a. Given a vehicle with a power brake unit, the learner will diagnose, remove and replace the unit. Brake pedal action must be easy with no leaks or air in system.

b. Questions at end of unit in Remling.

c. V'TECS, Automotive Mechanics; Task No. 180, 181

d. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Automotive vehicle
b. Shop manual
c. Assorted hand tools
d. Line wrench set

TASK

AS-59 Diagnosing brake system problems

PERFORMANCE OBJECTIVE

Develop a diagnostic plan for locating problems in the brake system.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Safety
b. Diagnosis procedures
c. Inspection procedures
d. Chassis components and their relationship

Provide Demonstration On:

a. Inspection procedures
b. Diagnosis procedures

Provide Practical Application On:

Inspecting and diagnosing a known problem on a vehicle using a troubleshooting plan

Related Instruction:

Tasks: RI-01; RI-03-05; RI-11; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)
b. Remling (2)
c. Stockel (1)(2)
d. Toboldt & Johnson

A/Vs:

a. Georgia Transportation Cluster (Slide set HB-1)
b. Georgia Auto Mechanics Program (Slide set 231-1-a, b; filmloop 231-1-B)
c. Ford, "Drum and Disc Brakes" (1201-504)

Student Manuals:

continued on back

CLASSROOM HOURS 4

EVALUATION (AS-59)

a. Given a vehicle with a faulty brake system, the learner will describe a troubleshooting plan and locate the problem and cause. The plan must lead the learner to the cause of the problem within established flat rate time.

b. Use questions from chapters in any of the textbooks.

c. V'TECS, Automotive Mechanics; Task No. 169

d. Georgia Student Assessmetn System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol, I, II

INSTRUCTIONAL MATERIALS

Student Manuals:

a. Georgia Transportation Cluster (HB-1)
b. Georgia Auto Mechanics Program (231-1)
c. Ford, "Diagnosis of Hydraulic Brakes" (1201-205)
d. Ford, "Drum and Disc Brakes" (1201-504)
e. MAVCC, Braking Systems
f. Oklahoma, Auto Mechanics I

Tools and Equipment:

a. Automotive vehicle
b. Shop manual
c. Assorted hand tools
d. Shop equipment to raise vehicle

TASK

AS-60

PERFORMANCE OBJECTIVE

Locate and identify suspension system components.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. The frame
b. Front suspension systems
c. Rear suspension systems
d. Springs and shock absorbers
e. Wheels and tires

Provide Demonstration On:

a. Identifying frame
b. Identifying front suspension components
c. Identifying rear suspension components
d. Identifying springs and shock absorbers
e. Identifying wheels and tires

Provide Practical Application On:

a. Identifying frame
b. Identifying front suspension components
c. Identifying rear suspension components
d. Identifying springs and shock absorbers
e. Identifying wheels and tires

Related Instruction:

Tasks: RI-01; RI-03; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Bacon
b. Billiet and Alley
c. Crouse and Anglin (1)
d. Remling (3)

A/Vs:

a. Bergwall, "The Front End Explained" (Filmstrip #1)
b. Prentice-Hall, "How the Automobile Works" (Filmstrip #1)
c. Ford, "Front and Rear Suspension Systems" (Slide set 1010-115)

Student Manuals:

a. Georgia Transportation Cluster (CL-6, CL-7)
b. Georgia Auto Mechanics Program (232-9)
c. Oklahoma, Auto Mechanics I

Tools and Equipment:

continued on back

CLASSROOM HOURS

2

EVALUATION (AS-60)

a. Given an operational automotive suspension system and necessary tools and equipment, the learner will identify and label suspension components. All identification must be 100% correct.

b. Hughes, Guide to the Automobile Mechanic Certification Exam

c. Bergwall, filmstrip questions

d. All textbooks have test questions included.

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Hand tools
b. Hoist or other lifting device
c. Parts catalog
d. Auto shop repair manual

TASK

AS-61 Inspecting suspension system components

PERFORMANCE OBJECTIVE

Inspect and evaluate suspension system components.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. The frame
b. Front suspension
c. Rear suspension
d. Springs and shock absorbers
e. Wheels and tires

Provide Demonstration On:

a. Inspecting the frame
b. Inspecting front suspension
c. Inspecting rear suspension
d. Inspecting springs and shock absorbers
e. Inspecting wheels and tires

Provide Practical Application On:

a. Inspecting and evaluating the frame
b. Inspecting and evaluating front suspension components
c. Inspecting and evaluating rear suspension components
d. Inspecting and evaluating springs and shock absorbers
e. Inspecting and evaluating wheels and tires

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-10; RI-12

INSTRUCTIONAL MATERIALS

Textbooks:

a. Bacon
b. Billiet & Alley
c. Crouse & Anglin (1)
d. Remling (3)

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 232-1A)
b. Bergwall, "The Front End Explained" (Filmstrip #1, 2)

Student Manuals:

a. Georgia Auto Mechanics Program (232-1)
b. Oklahoma, Auto Mechanics I

Tools and Equipment:

a. Hand tools
b. Hoist or other lifting device
c. Auto shop repair manual

CLASSROOM HOURS

2

EVALUATION (AS-61)

a. Given an operational automotive suspension system and necessary tools and equipment, the learner will inspect suspension system components. Unsafe conditions must be identified with 100% accuracy.

b. Hughes, Guide to the Automobile Mechanic Certification Exam

c. Bergwall, filmstrip questions

d. V'TECS, Automotive Mechanics; Task No. 196

e. Oklahoma, Auto Mechanics I

f. Textbooks have test questions included.

TASK

AS-62 Lubricating and adjusting front wheel bearings

PERFORMANCE OBJECTIVE

Inspect, lubricate and adjust front wheel bearings.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Lubricants
b. Bearing types
c. Drum brake hubs
d. Disc brake hubs

Provide Demonstration On:

a. Inpsecting and lubricating bearings
b. Adjusting front wheel bearings

Provide Practical Application On:

Removing, inspecting, lubricating and reinstalling front wheel bearings

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-10-11; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Bacon
b. Billiet & Alley
c. Crouse & Anglin (1)
d. Remling (3)

A/Vs:

a. Bergwall, "The Front End Explained" (Filmstrip #1)
b. Georgia Transportation Cluster (Slide set Cl-6, CL-7)
c. Prentice-Hall, "Steering and Suspension Systems" (Filmstrip #4)

Student Manuals:

a. Georgia Transportation Cluster (CL-6, CL-7)
b. Georgia Auto Mechanics Program (232-9)
c. Oklahoma, Auto Mechanics I

Tools and Equipment:

continued on back

CLASSROOM HOURS 2

EVALUATION (AS-62)

a. Given an operational automotive suspension system and necessary tools and equipment, the learner will lubricate and adjust front wheel bearings. All work must meet manufacturer's specifications.

b. Hughes, Guide to the Automobile Mechanic Certification Exam

c. Bergwall, filmstrip questions

d. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. II

e. V'TECS, Automotive Mechanics; Task No. 188, 189, 200

f. All textbooks have test questions included.

g. Oklahoma, Auto Mechanics I

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Hand tools
b. Lubricant
c. Torque wrench
d. Bearing packing tools
e. Auto shop repair manual

TASK

AS-63 Replacing shock absorbers

PERFORMANCE OBJECTIVE

Remove and replace shock absorbers.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Shock absorber construction
b. Shock absorber function

Provide Demonstration On:

a. Checking shock absorbers
b. Replacing shock absorbers

Provide Practical Application On:

Removing and replacing shock absorbers

Related Instruction:

Tasks: RI-01-03; RI-05; RI-11 RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Bacon
b. Billiet & Alley
c. Crouse & Anglin (1)
d. Remling (3)

Student Manuals:

Oklahoma, Auto Mechanics I

Tools and Equipment:

a. Hand tools
b. Auto shop repair manual
c. Hoist or other lifting device
d. Shock absorbers

CLASSROOM HOURS 2

EVALUATION (AS-63)

a. Given an operational automotive suspension system and necessary tools and equipment, the learner will remove and replace shock absorbers according to manufacturer's specifications.

b. Hughes, Guide to the Automobile Mechanic Certification Exam

c. V'TECS, Automotive Mechanics, Task No. 203

d. All textbooks have test questions included.

TASK

AS-64 Replacing front coil springs and rear leaf springs

PERFORMANCE OBJECTIVE

Inspect and replace coil springs and rear leaf springs.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Coil spring construction
b. Leaf spring construction
c. Coil and leaf spring construction
d. Coil spring compressor
e. Safety

Provide Demonstration On:

a. Replacing front coil springs
b. Replacing rear leaf springs

Provide Practical Application On:

a. Replacing front coil springs
b. Replacing rear leaf springs

Related Instruction:

Tasks: RI-01-03; RI-05; RI-11-13

INSTRUCTIONAL MATERIALS

Textbooks:

a. Bacon
b. Billiet & Alley
c. Crouse & Anglin (1)
d. Remling (3)

A/Vs:

Georgia Auto Mechanics Program (Slide set 232-13)

Student Manuals:

Georgia Auto Mechanics Program (Slide set 232-12, 232-13)

Tools and Equipment:

a. Hand tools
b. Coil spring compressor
c. Hoist or other lifting device
d. Auto shop repair manual

CLASSROOM HOURS 6

EVALUATION (AS-64)

a. Given an operational automotive suspension system and necessary tools and equipment, the learner will replace front coil springs and rear leaf springs according to standards of auto shop repair manual and manufacturer's specifications.

b. Hughes, Guide to the Automobile Mechanic Certification Exam

c. All textbooks have test questions included.

TASK

AS-65 Changing and balancing wheels and tires

PERFORMANCE OBJECTIVE

Repair, change and balance wheels and tires.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Wheel and tire construction function
b. Balancing principles

Provide Demonstration On:

a. Changing tires and wheels
b. Static balancing tires
c. Dynamic balancing tires
d. Tire repair

Provide Practical Application On:

a. Changing tires and wheels
b. Static balance tires
c. Dynamic balance tires
d. Repairing tires and wheels

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-11; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Bacon
b. Billiet & Alley
c. Crouse & Anglin (1)
d. Remling (3)

A/Vs:

a. Georgia Transportation Cluster (Slide set SSS-2, 3, 6A, 6B)
b. Georgia Auto Mechanics Program (232-7A, B, C; 232-8A, B; 232-10)
c. Ford, "Tire Problem Analysis" (Filmstrip 0910-004)
d. Prentice-Hall, "Basic Automotive Service" (Filmstrip #3) and "Wheel Balancing" (Filmstrip #1, 2)

Student Manuals:

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CLASSROOM HOURS

4

EVALUATION (AS-65)

a. Given an operational automotive suspension system and necessary tools and equipment, the learner will change, repair and balance wheels and tires. The tire will have no air leaks and must show no signs of "out of balance" when road tested.

b. Hughes, Guide to the Automobile Mechanic Certification Exam

c. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. II

d. V'TECS, Automotive Mechanics; Task No. 190

e. Oklahoma, Auto Mechanics I

f. All textbooks have test questions included.

INSTRUCTIONAL MATERIALS

Student Manuals:

a. Georgia Transportation Cluster (SSS-2, SSS-3, SSS-6)
b. Georgia Auto Mechanics Program (232-7, 232-8, 232-10)
c. Oklahoma, Auto Mechanics I

Tools and Equipment:

a. Hand tools
b. Tire changer
c. Static balancer
d. Dynamic balancer
e. Auto shop repair manual

TASK

AS-66 Replacing upper and lower control arms and bushings

PERFORMANCE OBJECTIVE

Inspect, remove and replace upper and lower control arms and bushings.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Control arm construction
b. Control arm function
c. Control arm bushing function
d. Safety

Provide Demonstration On:

a. Inspecting assemblies
b. Replacing upper control arm
c. Replacing upper control arm bushing
d. Replacing lower control arm
e. Replacing lower control arm bushing

Provide Practical Application On:

Replacing upper and lower control arm bushings on one side of vehicle

Related Instruction:

Tasks: RI-01-03; RI-05; RI-10-12

INSTRUCTIONAL MATERIALS

Textbooks:

a. Bacon
b. Billiet & Alley
c. Crouse & Anglin (1)
d. Remling (3)

A/Vs:

Georgia Auto Mechanics Program (Slide set 232-15)

Student Manuals:

a. Georgia Auto Mechanics Program (232-15)
b. Oklahoma, Auto Mechanics I

Tools and Equipment:

a. Hand tools
b. Coil spring compressor
c. Bushing removal installer tools
d. Control arm
e. Auto shop repair manual

CLASSROOM HOURS

8

EVALUATION (AS-66)

a. Given an operational automotive suspension system and necessary tools and equipment, the learner will replace upper and lower control arms and bushings in a safe manner according to standards of auto shop repair manual and manufacturer's specifications.

b. Hughes, Guide to the Automobile Mechanic Certification Exam

c. V'TECS, Automotive Mechanics; Task No. 201

d. Oklahoma, Auto Mechanics I

e. All textbooks have test questions included.

TASK

AS-67 Replacing upper and lower ball joints

PERFORMANCE OBJECTIVE

Inspect, remove and replace upper and lower ball joints.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Ball joint construction
b. Ball joint function
c. Safety

Provide Demonstration On:

a. Inspecting ball joints
b. Replacing upper ball joints
c. Replacing lower ball joints

Provide Practical Application On:

Replacing upper and lower ball joints

Related Instruction:

Tasks: RI-01-03; RI-05; RI-10-12

INSTRUCTIONAL MATERIALS

Textbooks:

a. Bacon
b. Billiet & Alley
c. Crouse & Anglin (1)
d. Remling (3)

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 232-15)
b. Bergwall, "The Front End Explained" (Filmstrip #3)
c. Prentice-Hall, "Steering and Suspension Systems" (Filmstrip #2, 5)

Student Manuals:

a. Georgia Auto Mechanics Program (232-15)
b. Oklahoma, Auto Mechanics I

Tools and Equipment:

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CLASSROOM HOURS

8

EVALUATION (AS-67)

a. Given an operational automotive suspension system and necessary tools and equipment, the learner will inspect and replace upper and lower ball joints in a safe manner according to standards of auto shop repair manual and manufacturer's specifications.

b. Hughes, Guide to the Automobile Mechanic Certification Exam

c. Bergwall, filmstrip questions

d. All textbooks have test questions included.

e. Oklahoma, Auto Mechanics I

f. V'TECS, Automotive Mechanics; Task No. 199

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Hand tools
b. Coil spring compressor
c. Ball joint separator
d. Ball joint kit
e. Auto shop repair manual

TASK

AS-68 Replacing king pins and bushings

PERFORMANCE OBJECTIVE

Inspect, remove and replace king pins and bushings.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. King pin construction
b. King pin function
c. Bushing contruction
d. Bushing function

Provide Demonstration On:

a. Replacing king pins
b. Replacing bushings

Provide Practical Application On:

Inspecting, removing and replacing king pins and bushings

Related Instruction:

Tasks: RI-01-03; RI-05-06; RI-10-12; RI-14

INSTRUCTIONAL MATERIALS

Textbooks:

a. Bacon
b. Billiet & Alley
c. Crouse & Anglin (1)

Tools and Equipment:

a. Hand tools
b. Tie rod end separator
c. Bushing tools
d. King pin set
e. Auto shop repair manual

CLASSROOM HOURS 6

EVALUATION (AS-68)

a. Given an operational automotive king pin type suspension system and necessary tools and equipment, the learner will replace king pins and bushings according to standards of auto shop repair manual and manufacturer's specifications.

b. Hughes, Guide to the Automobile Mechanic Certification Exam

c. All textbooks have test questions included.

d. V'TECS, Automotive Mechanics; Task No. 197

TASK

AS-69 Replacing torsion bars

PERFORMANCE OBJECTIVE

Inspect, remove and replace torsion bars

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Torsion bar construction
b. Torsion bar function
c. Safety

Provide Demonstration On:

a. Inspecting torsion bars
b. Replacing torsion bars

Provide Practical Application On:

Removing and replacing a torsion bar

Related Instruction:

Tasks: RI-01-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Bacon
b. Billiet & Alley
c. Crouse & Anglin (1)
d. Remling (3)

A/Vs:

a. Georgia Auto Mechanics Program (Film loop 232-11)
b. Prentice-Hall, "Steering and Suspension Systems" (Filmstrip #1)

Student Manuals:

Georgia Auto Mechanics Program (232-11)

Tools and Equipment:

a. Hand tools
b. Tie rod end separator
c. Auto shop repair manual
d. Torsion bar

CLASSROOM HOURS 4

EVALUATION (AS-69)

a. Given an operational automotive suspension system and necessary tools and equipment, the learner will inspect, remove and replace torsion bars according to standards of auto shop repair manual and manufacturer's specifications.

b. Hughes, Guide to the Automobile Mechanic Certification Exam

c. All textbooks have test questions included.

d. V'TECS, Automotive Mechanics; Task No. 186

TASK

AS-70 Replacing Twin I-beams

PERFORMANCE OBJECTIVE

Inspect, remove and replace Twin I-beams

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. I-beam construction
b. I-beam function

Provide Demonstration On:

Replacing Twin I-beams

Provide Practical Application On:

Replace Twin I-beams in a small truck

Related Instruction:

Tasks: RI-01-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Bacon
b. Billiet & Alley
c. Crouse & Anglin (1)

A/Vs:

Ford, "Twin I-Beam Front Suspension" (Filmstrip 1421-101)

Student Manuals:

Ford, "Twin I-Beam Front Suspension" (1421-101)

Tools and Equipment:

a. Hand tools
b. Ball joint separator
c. Tie rod end separator
d. I-beam component
e. Auto shop repair manual

CLASSROOM HOURS 8

EVALUATION (AS-70)

a. Given an operational automotive light truck with Twin I-beam suspension system and necessary tools and equipment, the learner will replace Twin I-beams according to standards of auto shop repair manual and manufacturer's specifications.

b. Hughes, Guide to the Automobile Mechanic Certification Exam

c. Textbooks have test questions included.

TASK

AS-71 Diagnosing suspension system problems

PERFORMANCE OBJECTIVE

Develop a troubleshooting plan for locating problems in the suspension system.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Suspension system construction
b. Suspension system function

Provide Demonstration On:

Diagnosing suspension system problems

Provide Practical Application On:

Diagnosing suspension system problems

Related Instruction:

Tasks: Ri-01; RI-03-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Bacon
b. Billiet & Alley
c. Crouse & Anglin (1)
d. Remling (3)

A/Vs:

Georgia Auto Mechanics Program (Filmstrip 282-6A, B)

Student Manuals:

Georgia Auto Mechanics Program (282-6)

Tools and Equipment:

a. Hand tools
b. Specifications
c. Auto shop repair manual

CLASSROOM HOURS 8

EVALUATION (AS-71)

a. Given an operational automobile with defective suspension system and necessary tools and equipment, the learner will develop a troubleshooting plan and locate the problem in double the flat rate time.

b. Hughes, Guide to the Automobile Mechanic Certification Exam

c. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

d. Diagnostic charts and questions are listed in the textbooks.

e. V'TECS, Automotive Mechanics; Task No. 196

TASK

AS-72 Identifying steering system components

PERFORMANCE OBJECTIVE

Identify the component parts of the steering system and steering gears.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Steering system components
b. Steering system design
c. Types of steering systems
d. Steering gear components
e. Types of steering gears

Provide Demonstration On:

a. Steering system inspection
b. Steering diagnosis procedure

Provide Practical Application On:

Raising a vehicle on lift or jack stands and identifying components of the steering system

Related Instruction:

Tasks: RI-01; RI-03; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Billiet & Alley
b. Crouse & Anglin (1)
c. Dwiggins
d. Remling (3)
e. Stockel (1) (2)
f. Toboldt & Johnson

A/Vs:

Georgia Transportation Cluster (Slide set SSS-7a & 7b)

Student Manuals:

a. Oklahoma, Auto Mechanics I
b. Ford, "Rack and Pinion Steering Gear" (1301-001)

Tools and Equipment:

a. Automotive chassis
b. Shop manual

CLASSROOM HOURS 4

EVALUATION (AS-72)

a. Given a vehicle, the learner will identify the component parts of the steering system with 100% accuracy.

b. Questions at end of chapters in all textbooks

c. Georgia Student Assessment, Domain Referenced Tests; Transportation/Automotive Mechanics, Volume I, II

TASK

AS-73 Adjusting manual steering gear

PERFORMANCE OBJECTIVE

Make all necessary steering gear adjustments.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Manual (recirculating ball and nut) gear components
b. Adjustment procedure
c. Preload adjustment
d. Rack and pinion components

Provide Demonstration On:

a. Adjusting standard type
b. Adjusting rack and pinion type

Provide Practical Application On:

Adjusting a manual steering gear on a unit provided

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Billiet & Alley
b. Crouse & Anglin (1)
c. Dwiggins
d. Remling (3)
e. Stockel (1), (2)
f. Toboldt & Johnson

A/Vs:

Georgia Auto Mechanics Program (Slide Set 233-1)

Student Manuals:

a. Georgia Auto Mechanics Program (233-1)
b. Oklahoma, Auto Mechanics I

Tools and Equipment:

continued on back

CLASSROOM HOURS

2

EVALUATION (AS-73)

a. Given a vehicle with maladjusted manual steering, the learner will make the necessary adjustments to manufacturer's specifications.

b. Questions at end of chapter of Remling (3)

c. V'TECS, Automotive Mechanics; Task No. 142, 143

d. Georgia Student Assessment, Domain Referenced Tests; Transportation/Automotive Mechanics, Volume I, II

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Automotive chassis with manual steering
b. Shop manual
c. Assorted hand tools
d. Inch pound torque wrench
e. Spanner wrench
f. Floor jack or lift

TASK

AS-74 Inspecting, lubricating and replacing steering gear linkage

PERFORMANCE OBJECTIVE

Inspect, lubricate, and remove and replace component parts of the steering linkage.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Steering linkage components
b. Steering linkage arrangement
c. Safety
d. Bushing types
e. Steering component lubrication
f. Lubricants

Provide Demonstration On:

a. Repair procedures
b. Steering arrangements
c. Types of bushing
d. Lubrication procedures

Provide Practical Application On:

Removing and replacing component parts of the steering system

Related Instruction:

Tasks: RI-01-03; RI-05; RI-10-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Billiet & Alley
b. Crouse and Anglin (1)
c. Dwiggins
d. Remling (3)
e. Stockel (1), (2)
f. Toboldt

A/Vs:

a. Georgia Transportation Cluster (Slide Set SSS-7a & 7b)
b. Georgia Auto Mechanics Program (Slide Set 232-14)

Student Manuals:

a. Oklahoma, Auto Mechanics I
b. Georgia Transportation Cluster (SSS-7)
c. Georgia Auto Mechanics Program (232-14)

Tools and Equipment:

continued on back

CLASSROOM HOURS

4

EVALUATION (AS-74)

a. Given a vehicle, the learner will remove and replace steering linkage components according to manufacturer's specifications.

b. V'TECS Automotive Mechanics, Task No. 147, 158, 159, 160, 161, 167, 168, 192, 193

c. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Volume I, II.

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Automotive chassis
b. Shop manual
c. Assorted hand tools
d. Special suspension tools
e. Lubrication gun

TASK

AS-75 Replacing power steering unit

PERFORMANCE OBJECTIVE

Inspect, remove and replace a power steering unit

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Types of steering units
b. Types of power steering pumps
c. Power steering components
d. Centering steering wheel
e. Steering system adaptation
f. Safety

Provide Demonstration On:

a. Removal and replacment procedures
b. Steering system adaptation

Provide Practical Application On:

Removing and replacing a power steering unit

Related Instructions:

Tasks: RI-01-03; RI-05; RI-10; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Dwiggins
b. Remling (3)

A/Vs:

a. Ford,"Car Power Steering" (Transparencies 1301-255, filmstrip 1341-204)
b. Georgia Auto Mechanics Program (Slide Set 283-3, 283-4, 283-6. Filmstrip 283-5)

Student Manuals:

a. Oklahoma, Auto Mechanics I
b. Georgia Auto Mechanics Program (283-1, 283-2, 283-3, 283-4, 283-5, 283-6)

Tools and Equipment:

a. Automotive chassis
b. Shop manual
c. Assorted hand tools
d. Special pullers

CLASSROOM HOURS

4

EVALUATION (AS-75)

a. Given a vehicle with power steering, the learner will remove and replace the power steering unit. The steering must perform to manufacturer's specifications with no leaks.

b. Use questions at end of chapters in both texts

c. V'TECS, Automotive Mechanics; Task No. 148, 149, 150, 155, 156, 157, 158

d. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Volume I, II

TASK

AS-76 Replacing steering column

PERFORMANCE OBJECTIVE

Remove and replace a steering column

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Types of steering columns
b. Steering column service precautions
c. Using steering wheel pullers
d. Steering couplings

Provide Demonstration On:

a. Disconnecting and relocating wiring
b. Pulling steering wheels

Provide Practical Application On:

Replacing a steering column

Related Instruction:

Tasks: RI-01-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)
b. Dwiggins
c. Remling(3)
d. Stockel (1), (2)

A/Vs:

Georgia Auto Mechanics Program (Slide Set 233-4-A; Filmstrip 233-4-B)

Student Manuals:

a. Oklahoma, Auto Mechanics I
b. Georgia Auto Mechanics Program (233-4)

Tools and Equipment:

a. Automobile
b. Shop manual
c. Assorted hand tools
d. Steering wheel puller

CLASSROOM HOURS 4

EVALUATION (AS-76)

a. Given a vehicle, the learner will remove and replace the steering column assembly according to manufacturer's minimum specifications.

b. V'TECS, Automotive Mechanics; Task No. 151, 152

c. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Volume I, II

TASK

AS-77 Aligning the front-end

PERFORMANCE OBJECTIVE

Make all necessary adjustments to restore front-end geometry.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Prealignment inspection
b. Wheel alignment fundamentals
c. Alignment procedures
d. Front suspension designs
e. Front-end alignment equipment

Provide Demonstration On:

a. Front suspension inspection
b. Alignment procedures
c. Use of the different types of equipment

Provide Practical Application On:

a. Performing prealignment inspection
b. Aligning a front-end

Related Instruction:

Tasks: RI-01-03; RI-05; RI-11; RI-14

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)
b. Dwiggins
c. Remling (3)
d. Stockel (1), (2)
e. Toboldt & Johnson

A/Vs:

a. Georgia Transportation Cluster (Slide Set SSS-7A & B; SSS-8A, B & C)
b. Georgia Auto Mechanics Program (Filmloop 232-2-B; 232-3-B; 232-5-B. Filmstrip 232-6-B; 232-6-B)

Student Manuals:

a. Georgia Transportation Cluster (SSS 7 and 8)
b. Georgia Auto Mechanics Program (232-2, 232-3, 232-4, 232-5, 232-6)
c. Ford Student Text (1401-001)
d. Oklahoma, Auto Mechanics I

Tools and Equipment:

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CLASSROOM HOURS

8

EVALUATION (AS-77)

a. Given a vehicle, the learner will inspect the system for wear and align front end to meet manufacturer's specifications.

b. Questions at end of chapters in the textbooks.

c. V'TECS, Automotive Mechanics; Task No. 191

d. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Volume I, II.

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Automobile
b. Shop manual
c. Front end equipment
d. Assorted hand tools
e. Special alignment equipment

TASK

AS-78 Diagnosing steering system problems

PERFORMANCE OBJECTIVE

Formulate a plan for diagnosing problems in the steering system .

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Types of suspension systems
b. Suspension designs
c. Diagnosis procedures
d. Use of special equipment

Provide Demonstration On:

a. Suspension designs
b. Diagnosis procedures
c. Special tools needed

Provide Practical Application On:

Placing a vehicle on a lift or jack stands and using the trouble shooting plan, make an inspection and determine conditions

Related Instructions:

Tasks: RI-01; RI-03-05; RI-10-11; RI-14-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (1)
b. Dwiggins
c. Remling (3)
d. Stockel (1), (2)
e. Toboldt & Johnson

A/Vs:

a. Georgia Auto Mechanics Program (Film 282-6-A, 282-6-B)
b. Georgia Transportation Cluster (SSS-7A & B)

Student Manuals:

a. Oklahoma, Auto Mechanics I
b. Georgia Auto Mechanics Program (282-6)
c. Georgia Transportation Cluster (SSS-7)

Tools and Equipment:

a. Automobile
b. Lift or jack
c. Shop manual
d. Assorted hand tools

CLASSROOM HOURS

4

EVALUATION (AS-78)

a. Given a vehicle with a faulty steering system, the learner will place the vehicle on a lift or jack stand. Using a troubleshooting plan, the learner will determine the condition of the suspension system

b. V'TECS, Automotive Mechanics; Task No. 146

c. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Volume I, II

TASK

AS-79 Identifying emissions control components

PERFORMANCE OBJECTIVE

Identify and describe the function of emissions control components.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Emission control construction
b. Emission control function
c. Emission control purpose
d. Emission control types

Provide Demonstration On:

Identifying and describing emission control components

Provide Practical Application On:

a. Identifying and locating emissions control components
b. Providing written or oral description of the function of components

Related Instructions:

Tasks: RI-01; RI-03; RI-07; RI-09-10; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (2)
b. Johnson
c. Wetzel

A/Vs:

a. Georgia Transportation Cluster or Auto Mechanics Program (Slide set AEC-01)
b. Prentice-Hall, "Servicing Ford and General Motors Emission Control Systems" (12 filmstrips and tapes covering all aspects)
c. Ford, "Emission Control Systems" (Slide set 0901-021)

Student Manuals:

a. Georiga Transportation Cluster (AEC-1)
b. Georgia Auto Mechanics Program (262-11)

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CLASSROOM HOURS 4

EVALUATION (AS-79)

a. Given an operational automotive engine and necessary tools and equipment, the learner will identify and describe the function of emissions control components. This must be done with 70% accuracy.

b. Crouse & Anglin, Workbook

c. Georgia Transportation Cluster or Auto Mechanics Program

d. Textbooks include test questions.

e. MAVCC, Automotive Emission Control

f. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

INSTRUCTIONAL MATERIALS

Student Manuals:

c. MAVCC, Automotive Emission Control
d. Ford, "Emission Control Systems" (0901-021, Vol. I, II; 0901-033)

Tools and Equipment:

a. Hand tools
b. Auto shop repair manual
c. Various emission components

TASK

AS-80 Measuring exhaust emissions

PERFORMANCE OBJECTIVE

Use the analyzer to measure exhaust emissions.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Infared analyzer
b. Analyzer components
c. Operation principles

Provide Demonstration On:

a. Setting up infared analyzer
b. Operating infared analyzer
c. Measuring exhaust emissions

Provide Practical Application On:

a. Set up infared analyzer
b. Operate infared analyzer
c. Measure and record exhaust emissions on two or more automobiles

Related Instructions:

Tasks: RI-01; RI-03; RI-05; RI-07; RI-09-10; RI-14-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (2)
b. Johnson
c. Wetzel

A/Vs:

a. Georgia Transportation Cluster (Slide set STE-8A, STE 8-B)
b. Georgia Auto Mechanics Program (Slide set 262-5B)
c. Bergwall, "Infared Exhaust Analyzer" (Filmstrips #1-3)

Student Manuals:

a. Georgia Transportation Cluster (AEC-2)
b. Georgia Auto Mechanics Program (262-12)
c. MAVCC, Automotive Emission Control

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CLASSROOM HOURS

4

EVALUATION (AS-80)

a. Given an operational automotive engine and necessary tools and equipment, the learner will measure and record exhaust emissions. Recorded readings must be within 5% of known values.

b. Crouse & Anglin, Workbook

c. Georgia Transportation Cluster or Auto Mechanics Program

d. Textbooks include test questions

e. Bergwall, filmstrip questions

f. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

g. MAVCC, Automotive Emission Control

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Hand tools
b. Infared analyzer
c. Auto shop repair manual

TASK

AS-81 Testing and replacing components in the positive crankcase ventilation (PCV) system

PERFORMANCE OBJECTIVE

Test and replace components in the positive crankcase ventilation (PCV) system.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. PCV system function
b. PCV system components and function

Provide Demonstration On:

a. Testing PCV system components
b. Replacing PCV system components

Provide Practical Application On:

Testing and replacing PCV

Related Instructions:

Tasks: RI-01-03; RI-05; RI-07; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (2)
b. Johnson
c. Wetzel

A/Vs:

Georgia Transportation Cluster or Auto Mechanics Program (Slide set AEC-4)

Student Manuals:

a. Georgia Transportation Cluster (AEC-4)
b. Georgia Auto Mechanics Program (262-14)
c. MAVCC, Automotive Emission Control

Tools and Equipment:

a. Hand tools
b. Tachometer
c. Inclined ramp and ball PCV tester
d. Adjustable PCV tester
e. PCV valves
f. Auto shop repair manual

CLASSROOM HOURS

2

EVALUATION (AS-81)

a. Given an operational automotive engine with PCV emissions system and necessary tools and equipment, the learner will test and replace the components in the PCV system according to standards in the auto shop repair manual or manufacturer's specifications.

b. Crouse & Anglin, Workbook

c. Georgia Transportation Cluster or Auto Mechanics Program

d. Textbooks include test questions.

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanic, Vol. I, II

f. MAVCC, Automotive Emission Control

g. V'TECS, Automotive Mechanics; Task No. 16

TASK

AS-82 Testing and replacing components in the fuel evaporative control system

PERFORMANCE OBJECTIVE

Test and replace components in the fuel evaporative control system.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Fuel evaporative control function
b. Fuel evaporative control components
c. Fuel evaporative components and function

Provide Demonstration On:

a. Testing fuel evaporative control components
b. Replacing fuel evaporative control components

Provide Practical Application On:

a. Test fuel evaporative control components
b. Replace fuel evaporative control components

Related Instructions:

Tasks: RI-01-03; RI-05; RI-09; RI-11; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (2)
b. Johnson
c. Wetzel

A/Vs:

Georgia Transportation Cluster or Auto Mechanics Program (Slide set AEC-7)

Student Manuals:

a. Georgia Transportation Cluster (AEC-7)
b. Georgia Auto Mechanics Program (262-17)
c. MAVCC, Automotive Emission Control

Tools and Equipment:

a. Hand tools
b. Hoist
c. Emission tester
d. Tachometer
e. Auto shop repair manual

CLASSROOM HOURS	4

EVALUATION (AS-82)

a. Given an operational automotive engine with fuel evaporative control system and necessary tools and equipment, the learner will test and replace the system components according to standards of Auto shop repair manual or manufacturer's specifications.

b. Crouse & Anglin, Workbook

c. Georgia Transportation Cluster or Auto Mechanics Program

D. Textbooks include test questions

e. MAVCC, Automotive Mechanics; Task No. 121

TASK

AS-83 Testing and replacing components in the exhaust gas recirculation (EGR) system

PERFORMANCE OBJECTIVE

Test and replace components in the exhaust gas recirculation (EGR) system.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. EGR system function
b. EGR components
c. EGR components function

Provide Demonstration On:

a. Testing exhaust gas recirculation system components
b. Replacing exhaust gas recirculation system components

Provide Practical Application On:

Testing and replacing exhaust gas recirculation system components

Related Instructions:

Tasks: RI-01-03; RI-05; RI-09; RI-11; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (2)
b. Johnson
c. Wetzel

A/Vs:

Georgia Transportation Cluster or Auto Mechanics Program (Slide set AEC-8)

Student Manuals:

a. Georgia Transportation Cluster (AEC-8)
b. Georgia Auto Mechanics Program (262-18)
c. Ford, "Exhaust Gas Recirculation Systems" (0901-016)
d. MAVCC, Automotive Emissions Control

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CLASSROOM HOURS 4

EVALUATION (AS-83)

a. Given an operational automotive engine with EGR emissions system and necessary tools and equipment, the learner will test and replace the system components according to standards of auto shop repair manual or manufacturer's specifications.

b. Crouse & Anglin, Workbook

c. Georgia Transportation Cluster or Auto Mechanics Program

d. Textbooks include test questions.

e. MAVCC, Automotive Emission Control

f. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Hand tools
b. Vacuum gauge
c. Tachometer
d. Hand vacuum pump
e. Auto shop repair manual

TASK

AS-84 Testing and replacing the catalytic converter

PERFORMANCE OBJECTIVE

Test, remove and replace the catalytic converter.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Catalytic converter construction
b. Catalytic converter function

Provide Demonstration On:

a. Testing a catalytic converter
b. Replacing a catalytic converter

Provide Practical Application On:

Testing and replacing catalytic converter

Related Instructions:

Tasks: RI-01-03; RI-05; RI-11; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (2)
b. Johnson
c. Wetzel

A/Vs:

Georgia Transportation Cluster or Auto Mechanics Program (Slide set AEC-10)

Student Manuals:

a. Georgia Transportation Cluster (AEC-10)
b. Georgia Auto Mechanics Program (262-20)
c. MAVCC, Automotive Emission Control

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CLASSROOM HOURS 4

EVALUATION

(AS-84)

a. Given an operational automotive engine with catalytic converter system and necessary tools and equipment, the learner will test and replace the converter to standards in the Auto shop repair manual or manufacturer's specifications.

b. Crouse & Anglin, Workbook

c. Georgia Transportation Cluster or Auto Mechanics Program

d. Textbooks include test questions.

e. MAVCC, Automotive Emission Control

f. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol, I, II

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Hand tools
b. Emissions tester
c. Tachometer
d. Hoist
e. Catalytic converter cut-a-way
f. Auto shop repair manual

TASK

AS-85 Testing and replacing components in the thermostatic air cleaner (TAC) system

PERFORMANCE OBJECTIVE

Test and replace components in the thermostatic air cleaner system.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. TAC system function
b. TAC components
c. TAC components function

Provide Demonstration On:

a. Testing TAC system components
b. Replacing TAC system components

Provide Practical Application On:

Testing and replacing TAC system components

Related Instructions:

Tasks: RI-01-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (2)
b. Johnson
c. Wetzel

A/Vs:

a. Georgia Transportation Cluster or Auto Mechanics Program (Slide set AEC-5)
b. Prentice-Hall,"Servicing Ford and General Motors Control Systems"(Filmstrip #2)

Student Manuals:

a. Georgia Transportation Cluster (AEC-5)
b. Georgia Auto Mechanics Program (262-15)
c. MAVCC, Automotive Emission Control

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CLASSROOM HOURS	4

EVALUATION (AS-85)

a. Given an operational automotive engine with TAC emissions system and necessary tools and equipment, the learner will test and replace components of the system according to standards in the auto shop repair manual or manufacturer's specifications.

b. Crouse & Anglin, Workbook

c. Georgia Transportation Cluster or Auto Mechanics Program

d. Textbooks include test questions.

e. MAVCC, Automotive Emission Control

f. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Hand tools
b. Pan for water and heat source
c. Thermometer
d. Vacuum guage & hand vacuum pump
e. Tachometer
f. Exhaust analyzer
g. TAC components
h. Auto shop repair manual

TASK

AS-86 Testing and replacing components in the air injection reaction (AIR) system

PERFORMANCE OBJECTIVE

Test and replace components in the air injection reaction (AIR) system.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. AIR system function
b. AIR components
c. AIR components function

Provide Demonstration On:

a. Testing AIR system components
b. Replacing AIR system components

Provide Practical Application On:

Testing and replacing AIR system components

Related Instructions:

Tasks: RI-01-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (2)
b. Johnson
c. Wetzel

A/Vs:

a. Georgia Transportation Cluster or Auto Mechanics Program (Slide set AEC-6)
b. Prentice-Hall, "Servicing Ford and General Motors Emission Control Systems" (Filmstrip #4)

Student Manuals:

a. Georgia Transportation Cluster (AEC-6)
b. Georgia Auto Mechanics Program (262-16)
c. MAVCC, Automotive Emission Control

Tools and Equipment:

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CLASSROOM HOURS 4

EVALUATION (AS-86)

a. Given an operational automotive engine with AIR emissions system and necessary tools and equipment, the learner will test and replace the system components according to standards in the auto shop repair manual or manufacturer's specifications.

b. Crouse & Anglin, Workbook

c. Georgia Transportation Cluster or Auto Mechanics Program.

d. Textbooks include test questions.

e. MAVCC, Automotive Emission Control

f. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Hand tools
b. Tachometer
c. Vacuum gauge
d. Soap & water container
e. Exhaust analyzer
f. Air system components
g. Auto shop repair manual

TASK

AS-87 Testing and replacing components in the spark control system

PERFORMANCE OBJECTIVE

Test and replace components in the spark control system.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Spark control system function
b. Spark control components
c. Spark control components function

Provide Demonstration On:

a. Testing spark control components
b. Replacing spark control components

Provide Practical Application On:

Testing and replacing spark control components

Related Instructions:

Tasks: RI-01-03; RI-05; RI-07

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (2)
b. Johnson
c. Wetzel

A/Vs:

a. Georgia Transportation Cluster or Auto Mechanics Program (Slide set AEC-9)
b. Prentice-Hall, "Servicing Ford and General Motors Emission Control Systems" (Filmstrip #6)

Student Manuals:

a. Georgia Transportation Cluster (AEC-9)
b. Georgia Auto Mechanics Program (262-19)
c. MAVCC, Automotive Emission Control

Tools and Equipment:

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CLASSROOM HOURS

4

EVALUATION (AS-87)

a. Given an operational automotive engine with spark control emissions system and necessary tools and equipment, the learner will test and replace system components according to standards in the auto shop repair manual or manufacturer's specifications.

b. Crouse & Anglin, Workbook

c. Georgia Transportation Cluster or Auto Mechanics Program

d. Textbooks include test questions.

e. MAVCC, Automotive Emission Control

f. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Hand tools
b. Emissions analyzer
c. Tachometer
d. Vacuum gauge
e. Hoist
f. Spark control components
g. Auto shop repair manual

TASK

AS-88 Removing and replacing exhaust pipes, mufflers and tail pipes

PERFORMANCE OBJECTIVE

Remove and replace exhaust pipes, mufflers and tail pipes.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Exhaust and tail pipe construction
b. Muffler construction
c. Exhaust and tail pipe function
d. Muffler function

Provide Demonstration On:

a. Removing and replacing exhaust pipes
b. Removing and replacing tail pipes
c. Removing and replacing mufflers

Provide Practical Application On:

a. Removing and replacing the exhaust pipe
b. Removing and replacing the tail pipe
c. Removing and replacing the muffler

Related Instructions:

Tasks: RI-01-03; RI-05; RI-11-13

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (2)
b. Johnson
c. Remling (1)
d. Wetzel

A/Vs:

a. Georgia Transportation Cluster (Slide set FS-6)
b. Georgia Auto Mechanics Program (Slide set 213-9)

Student Manuals:

a. Georgia Transportation Cluster (FS-6)
b. Georgia Auto Mechanics Program (213-9)
c. Oklahoma, Auto Mechanics I

Tools and Equipment:

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CLASSROOM HOURS	6

EVALUATION (AS-88)

a. Given an operational automotive engine and necessary tools and equipment, the learner will remove and replace the exhaust pipe(s), muffler(s) and tail pipe(s). Upon completion, all fittings must be tight and leak proof. All work must conform to manufacturer's specifications.

b. Crouse & Anglin, Workbook

c. All textbooks include test questions.

d. Oklahoma, Auto Mechanics I

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

f. V'TECS, Automotive Mechanics; Task No. 23, 27

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Hand tools
b. Exhaust system special tools kit
c. Muffler cut-a-way
d. Auto shop repair manual

TASK

AS-89 Diagnosing emissions control and exhaust system problems

PERFORMANCE OBJECTIVE

Develop a troubleshooting plan for determining causes of excessive emissions.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Emissions control construction and functions
b. Exhaust system construction and functions

Provide Demonstration On:

a. Diagnosing emissions control problems
b. Diagnosing exhaust and fuel system emission problems

Provide Practical Application On:

a. Diagnosing emissions control problems
b. Diagnosing exhaust and fuel system emissions problems

Related Instructions:

Tasks: RI-01; RI-03-05; RI-07; RI-09-12; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (2)
b. Johnson
c. Wetzel

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 223-13A; Filmstrip 223-13B)
b. Bergwall, "Infared Exhaust Analyzer" (Filmstrip #4-5)
c. Prentice-Hall, "Servicing Ford and General Motors Emmission Control Systems" (Filmstrip #6)

Student Manuals:

a. Georgia Auto Mechanics Program (223-13)
b. MAVCC, Automotive Emissions Control

Tools and Equipment:

a. Hand tools
b. Diagnostic charts from textbooks
c. Emissions analyzer

CLASSROOM HOURS

4

EVALUATION (AS-89)

a. Given an operational automotive engine with excessive emissions and necessary tools and equipment, the learner will develop a troubleshooting plan and locate the problem in double the flat rate time.

b. Crouse & Anglin, Workbook

c. Hughes, Guide to Automobile Mechanics Certification Exam

d. MAVCC, Automotive Emission Control

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

f. Textbooks contain test questions and diagnostic charts.

g. V'TECS, Auto Mechanics; Task No. 20, 120, 121

TASK

AE-01 Identifying cylinder head component parts

PERFORMANCE OBJECTIVE

Identify and provide a written description of the cylinder head component parts.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Valve size (exhaust & intake)
b. Different kinds of valve seals
c. Wear points (stem & guides)
d. Difference if any of valve face and seat (30° & 45° angle)
e. Valve interference angle
f. Valve guides (replaceable & non-replaceable guides)

Provide Demonstration On:

Use each part as a visual aid as its function and description is explained

Provide Practical Application On:

Lay out parts and have learner identify and write a description and function

Related Instructions:

Tasks: RI-01; RI-03; RI-06

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (1)
b. Stockel (1)

A/Vs:

Bergwall, "The Internal Combustion Engine Explained" (Filmstrip #1, 2)

Student Manuals:

Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Cylinder head and all component parts
b. Parts manual or microfiche

CLASSROOM HOURS

2

EVALUATION (AE-01)

a. Given a disassembled cylinder head and all component parts displayed on table, the learner will identify all parts by name and write a description and function of each. 70% accuracy is required.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Textbooks have questions included

d. Oklahoma, Auto Mechanics II

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Auto Mechanics, Vol. II

f. Bergwall, filmstrip questions

TASK

AE-02 Performing the cylinder compression and leakage test

PERFORMANCE OBJECTIVE

Measure and record cylinder compression and leak down rate.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Use of compression tester
b. Use of cylinder leak tester
c. Use of valve train timing (locating top dead center)
d. Interpretation of compression test
e. Interpretation of cylinder leak test
f. Procedure for warming engine
g. Dry test
h. Wet test

Provide Demonstration On:

a. Compression test
b. Cylinder leak test

Provide Practical Application On:

Performing and recording compression and cylinder leakage measurements on an automotive engine

Related Instructions:

Tasks: RI-01; RI-03; RI-05; RI-07; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (1)
b. Stockel (1), (2)

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 223-1)
b. Bergwall, "Problems of the Internal Combustion Engine Explained" (Filmstrip #1)

Student Manuals:

a. Georgia Auto Mechanics Program (223-1)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Vehicle for testing
b. Hand tools common to task
c. Compression tester
d. Cylinder leak tester
e. Shop manual

CLASSROOM HOURS 6

EVALUATION (AE-02)

a. Given an automobile engine with a loss of compression and tools and equipment, the learner will perform a compression test and/or cylinder leak test. Readings must be within 5% of known values.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Textbooks have questions included.

d. Oklahoma, Auto Mechanics II

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Auto Mechanics, Vol. I, II

f. V'TECS, Automotive Mechanics; Task No. 13, 14, 15

g. Bergwall, filmstrip questions

TASK

AE-03 Adjusting the valves

PERFORMANCE OBJECTIVE

Adjust valves equipped with mechanical lifters and hydraulic lifters.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Difference between mechanical & hydraulic valve lifters
b. Cold and hot adjustments
c. Relationship of valve timing and adjustment positions
d. The need for different clearances for intake valves & exhaust valves
e. Importance of oiling for push rods, rocker arms and etc.
f. Use of torque wrench
g. Correct replacement of valve cover & gasket
h. Care of secondary (spark plug) wires

Provide Demonstration On:

a. Removing spark plug wires and valve cover
b. Use of feeler gauge
c. Adjusting valves
d. Replacing valve covers
e. Checking for oil leaks

Provide Practical Application On:

Adjusting both mechanical lifters and hydraulic lifters

Related Instructions:

Tasks: RI-01; RI-03; RI-05; RI-07; RI-11; RI-14-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (1)
b. Stockel (1), (2)

A/Vs:

a. Georgia Transportation Cluster (Slide set VGA-12)
b. Georgia Auto Mechanics Program (Slide set 211-17A; filmloop 211-17B, 211-17C)

Student Manuals:

a. Georgia Transportation Cluster (VGA-12)
b. Georgia Auto Mechanics Program (211-17)
c. Oklahoma, Auto Mechanics II

Tools and Equipment:

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CLASSROOM HOURS 3

EVALUATION (AE-03)

a. Given an automobile engine with out of adjustment hydraulic or mechanical valve lifters, tools and equipment, the learner will adjust the valves to within .002" of manufacturer's specifications.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Textbooks have questions included.

d. Oklahoma, Auto Mechanics II

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

f. V'TECS, Automotive Mechanics; Task No. 2

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Vehicle suitable for task
b. Tools common to task
c. Gaskets
d. Cleaning vat
e. Shop manual

TASK

AE-04 Removing the cylinder head(s)

PERFORMANCE OBJECTIVE

Remove the cylinder head(s) from an automotive engine.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Removing vacuum hoses
b. Removing emission control components
c. Removing intake manifold
d. Draining cooling system (radiator & block)
e. Removing distributor
f. Proper storing of parts as they are removed from vehicle
g. Removing exhaust manifolds
h. Removing cylinder head

Provide Demonstration On:

a. Draining cooling system
b. Removing component parts
c. Removing cylinder heads

Provide Practical Application On:

Cylinder head removal on a V-6, V-8 or 6-cylinder engine

Related Instructions:

Tasks: RI-01; RI-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

Crouse (1)

A/Vs:

a. Georgia Transportation Cluster (Slide set VGA-1)
b. Prentice-Hall, "Automotive Engine Overhaul" (Filmstrip #1)

Student Manuals:

a. Georgia Transportation Cluster (VGA-1)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Vehicle for performing task
b. Tools common to task
c. Cleaning vat
d. Shop manual

CLASSROOM HOURS

10

EVALUATION (AE-04)

a. Given a vehicle and necessary tools and equipment, the learner will remove the cylinder head(s) in accordance with manufacturer's specifications.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Textbooks have questions included

d. Oklahoma, Auto Mechanics II

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol I, II

TASK

AE-05 Removing and inspecting the valves and component parts

PERFORMANCE OBJECTIVE

Remove, clean and inspect the valves and component parts.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Proper names for all component parts
b. Importance of replacing parts in same position
c. Inspecting valve spring
d. Height (free standing)
e. Checking compression value of valve springs
f. Checking valve seat width
g. Checking valve stem and valve guides
h. Cleaning and inspecting head, face, margin and stem

Provide Demonstration On:

a. Measuring valve spring heights (free standing)
b. Testing valve spring tension
c. Checking valve stem and valve guide wear
d. Using wire brush to clean

Provide Practical Application On:

Removing, cleaning and inspecting valves and parts from cylinder heads

Related Instructions:

Tasks: RI-01; RI-03; RI-05-07; RI-11; RI-14

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (1)
b. Stockel (2)

A/Vs:

Prentice-Hall, "Cylinder Head Service" (Filmstrip #1)

Student Manuals:

Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Valve spring tool
b. 12" ruler
c. Valve srping measuring device (tension)
d. Dial indicator
e. Shop manual

CLASSROOM HOURS

6

EVALUATION (AE-05)

a. Given an assembled automotive cylinder head, tools and equipment, the learner will remove component parts and valves, and clean and inspect and make recommendations for repair. All parts not meeting minimum manufacturer's specifications must by identified.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Textbooks have questions included

d. Oklahoma, Auto Mechanics II

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

TASK

AE-06 Refacing the valves and valve stems

PERFORMANCE OBJECTIVE

Reface valves and valve stems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Construction of valves
b. Identifying angle of face and margin dimension
c. Bent or worn vavles
d. Measurement of valve stem to valve guide
e. Valve grinding equipment

Provide Demonstration On:

a. Checking valve stems for wear
b. Checking valves for warped stems
c. Checking valve face for cracks, blisters and face margin
d. Setting valve machine for proper angle of valve face
e. Installing valve in chuck properley
f. Setting micrometer
g. Grinding face of valve and stem as per specifications

Provide Practical Application On:

Inspecting and refacing valves to manufacturer's specifications

Related Instructions:

Tasks: RI-01; RI-03; RI-05-06; RI-14

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (1)
b. Stockel (2)

A/Vs:

a. Georgia Transportation Cluster (Slide set VGA-2, VGA-4, 4B, VGA-5)
b. Georgia Auto Mechanics Program (Slide set 211-6A, 211-6A-1; Filmloop 211-6B,C)
c. Sioux, "Reconditioning the Cylinder Head" (16mm film)
d. Bergwall, "How to use a Valve and Valve Seat Refacer" (Filmstrip #1, 3)
e. Prentice-Hall, "Cylinder Head Service" (Filmstrip #2)

Student Manuals:

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CLASSROOM HOURS 6

EVALUATION (AE-06)

a. Given a set of valves with pitted or worn faces and stems, tools and equipment, the learner will reface valves and stems to manufacturer's specifications.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Textbooks have questions included.

d. Oklahoma, Auto Mechanics II

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

f. V'TECS, Automotive Mechanics; Task No. 8

g. Bergwall, filmstrip questions

INSTRUCTIONAL MATERIALS

Student Manuals:

a. Georgia Transportation Cluster (VGA-2, 3, 4, 5)
b. Georgia Auto Mechanics Program (211-6)
c. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Micrometer
b. Valve machine
c. Shop manual

TASK

AE-07 Inspecting the cylinder head

PERFORMANCE OBJECTIVE

Clean and inspect the cylinder head for warpage, cracks, blockage and valve seat wear.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Methods of cleaning the head
b. Use of straight edge for determining warpage
c. Liquid test for cracks
d. Valve seat inspection
e. Valve guide inspection

Provide Demonstration On:

a. Procedure for using straight edge
b. Liquid testing of cylinder head
c. Cleaning head with drill motor and wire brushes
d. Inspecting valve seats & guides

Provide Practical Application On:

Cleaning and inspecting the cylinder head for warpage, cracks, valve seat and guide condition

Related Instructions:

Tasks: RI-01; RI-03; RI-06; RI-12; RI-14

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (1)
b. Stockel (2)

A/Vs:

a. Georgia Transportation Cluster (Slide set VGA-6)
b. Bergwall, "How to Overhaul an Engine" (Filmstrip #5)

Student Manuals:

a. Georgia Transportation Cluster (VGA-6)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Straight edge
b. Feeler gauge
c. Flat carbon seraper
d. Cleaning vat
e. Shop manual

CLASSROOM HOURS

2

EVALUATION (AE-07)

a. Given an automobile cylinder head of known condition and tools and equipment, the learner will clean, check and test cylinder head. All known defects must be identified and evaluated according to manufacturer's specifications.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Textbooks have questions included

d. Oklahoma, Auto Mechanics II

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

f. V'TECS, Automotive Mechanics; Task No. 11

g. Bergwall, filmstrip questions

TASK

AE-08 Grinding the valve seats

PERFORMANCE OBJECTIVE

Grind valve seats in head as per manufacturer's specifications.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Cleaning valve seat and valve port
b. Selecting dressing stones of correct size and texture
c. Selecting correct valve guide piolet
d. Lowering or raising valve seat face
e. Using valve seat equipment
f. Valve stone dressing stand

Provide Demonstration On:

a. Dressing stone to proper degree
b. Grinding valve seats with grinding motor
c. Using dial indicator to measure valve seat concentricity

Provide Practical Application On:

Grinding valve seats to correct dimensions

Related Instructions:

Tasks: RI-01; RI-03; RI-05-06; RI-14

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (1)
b. Stockel (2)

A/Vs:

a. Georgia Transportation Cluster (Slide set VGA-7)
b. Georgia Auto Mechanics Program (Slide set 211-7A; Filmloop 211-7B,C)
c. Bergwall, "How to Use a Valve and Valve Seat Refacer" (Filmstrip #2)
d. Prentice-Hall, "Cylinder Head Service" (Filmstrip #3)

Student Manuals:

a. Georgia Trasnportation Cluster (VGA-7)
b. Georgia Auto Mechanics Program (211-7)
c. Oklahoma, Auto Mechanics II

Tools and Equipment:

continued on back

CLASSROOM HOURS

6

EVALUATION (AE-08)

a. Given an automotive cylinder head, tools and equipment, the learner will resurface valve seats. All work must be within manufacturer's specifications.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Textbooks have questions included.

d. Oklahoma, Auto Mechanics II

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

f. V'TECS, Automotive Mechanics; Task No. 28

g. Bergwall, filmstrip questions

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Valve seat grinding motor
b. Valve grinding stones and piolet
c. Dial indicator for measuring valve seat
d. Shop manual

TASK

AE-09 Servicing the rocker arm, push rod and lifter assemblies

PERFORMANCE OBJECTIVE

Service the rocker arm, push rod and lifter assemblies

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Inspecting rocker arm, studs or shaft assembly for wear
b. Inspecting rocker push rod ball
c. Inspecting push rod socket end
d. Inspecting camshaft end of lifters
e. Inspecting push rod end of lifters
f. Inspecting ball swivell and rocker arm inner faces
g. Testing hydraulic lifters

Provide Demonstration On:

a. Inspecting all component parts of rocker arms and lifters
b. Resurface lifter
c. Resurface rocker arm pads
d. Testing hydraulic lifters

Provide Practical Application On:

Inspecting and refacing lifters and rocker arms

Related Instructions:

Tasks: RI-01-03; RI-05-07; RI-10-11; RI-14

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (1)
b. Stockel (2)

A/Vs:

Georgia Transportation Cluster (Slide set VGA-10, VGA-11)

Student Manuals:

Georgia Transportation Cluster (VGA-10, 11)

Tools and Equipment:

a. Valve grinding machine
b. Shop manual

CLASSROOM HOURS 4

EVALUATION (AE-09)

a. Given a set of rocker arms, push rods and lifter assemblies, tools and equipment, the learner will inspect and determine usability of all components within manufacturer's specifications.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Textbooks have questions included

d. Oklahoma, Auto Mechanics II

e. V'TECS, Automotive Mechanics; Task No. 28

TASK

AE-10 Reassembling and replacing the cylinder head(s)

PERFORMANCE OBJECTIVE

Reassembling and replacing the cylinder heads.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Lapping valves
b. Installing valves, springs, seals and keepers
c. Cleaning surface of block
d. Cleaning cylinder head bolts and threads (block & bolts)
e. Use of torque wrench
f. Head tightening procedures
g. Adjusting valves (cold & hot)

Provide Demonstration On:

a. Lapping valves
b. Reassembling cylinder head using same valves in valve ports they were removed from
c. Installing gaskets and cylinder head as per manufacturer's specifications
d. Tightening cylinder head bolts
e. Replacing all other component parts
f. Filling radiator
g. Warming engine 20 to 30 min.
h. Adjusting valves
h. Checking for oil and water leaks

continued on back

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (1)
b. Stockel (2)

A/Vs:

a. Georgia Transportation Cluster (Slide set VGA-8, VGA-9)
b. Georgia Auto Mechanics Program (Slide set 211-8A, 211-15A; Filmloop 211-8B, 211-15B)
c. Prentice-Hall, "Cylinder Head Service" (Filmstrip #4)

Student Manuals:

a. Georgia Transportation Cluster (VGA-8, 9)
b. Georgia Auto Mechanics Program (211-8, 15)
c. Oklahoma, Auto Mechanics II

Tools and Equipment:

continued on back

CLASSROOM HOURS	6

EVALUATION (AE-10)

a. Given a cylinder head and all component parts, tools and equipment, the learner will reassemble and install cylinder head(s) according to manufacturer's specifications. Upon completion compression must be within manufacturer's tolerances and no occurance of water leaks or exhaust leaks after completion of road test.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Textbooks have questions included

d. Oklahoma, Auto Mechanics II

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

Reassembling and installing cylinder head

Related Instructions:

Tasks: RI-01-03; RI-05; RI-07; RI-11

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Basic tool set
b. Valve spring compressor
c. Lapping tools and compound
d. Torque wrench
e. Auto from which cylinder head(s) have been removed from

TASK

AE-11 Diagnosing problems in the valve train

PERFORMANCE OBJECTIVE

Develop a troubleshooting plan for locating problems in the valve train.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Detecting valve problems with vacuum guage
b. Checking valve problems with compression gauge or cylinder leak test
c. Valve noise
d. Oiling or component parts of valve train
e. Valve adjustment procedure and clearance checks

Provide Demonstration On:

a. Cylinder leak test or compression test
b. Checking engine with vacuum gauge
c. Checking valve noise with listening device

Provide Practical Application On:

a. Locating an engine miss due to burned valves or defective valve train
b. Locating source of valve train noise

Related Instructions:

Tasks: RI-01; RI-03-05; RI-07; RI-11; RI-14-15

INSTRUCTIONAL MATERIALS

Textbooks:

Stockel (2)

A/Vs:

a. Georgia Auto Mechanics Program (Filmstrip 211-20A,B)
b. Bergwall, "The Internal Combustion Engine Explained" (Filmstrip #4)

Student Manuals:

a. Georgia Auto Mechanics Program (211-20)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Tools common to task
b. Cylinder leak tester
c. Compression tester
d. Stethoscope or other listening device

CLASSROOM HOURS 4

EVALUATION (AE-11)

a. Given an operational automotive engine with a valve train related engine miss or noise, tools and equipment, the learner will develop a troubleshooting plan and locate the problem in double the flat rate time.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Textbooks have questions included.

d. Oklahoma, Auto Mechanics II

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

f. V'TECS, Automotive Mechanics; Task No. 5

g. Bergwall, filmstrip questions

TASK

AE-12 Removing component parts

PERFORMANCE OBJECTIVE

Remove necessary parts to gain access to the vibration damper.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Determining what must be removed
b. Removal procedures
c. Care of painted surfaces
d. Importance of marking parts for reassembly

Provide Demonstation On:

a. Removing radiator
b. Removing water and power steering pumps
c. Marking braces or brackets

Provide Practical Application On:

Removing radiator, water pump and power steering pump

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-07; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Glenn
b. Stockel (1)(2)
c. Toboldt & Johnson

Student Manuals:

Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Automotive engine in chassis
b. Shop manual
c. Assorted hand tools
d. Line wrench set

CLASSROOM HOURS

6

EVALUATION (AE-12)

a. Given a vehicle, the learner will remove the necessary parts to gain access to the vibration damper without damage and in stated flat rate time.

b. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. II

TASK

AE-13 Removing vibration damper

PERFORMANCE OBJECTIVE

Remove a vibration damper from an engine mounted in a vehicle.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Types of pullers touse
b. Special care in removing vibration damper
c. Inspection of seal area of damper

Provide Demonstration On:

a. How to attach puller
b. Puller adapters for crankshaft

Provide Practical Application On:

Removing a vibration damper from an engine

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Glenn
b. Stockel (1) (2)

Student Manuals:

Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Automobile engine in chassis
b. Shop manual
c. Assorted hand tools
d. Puller

CLASSROOM HOURS

2

EVALUATION (AE-13)

a. Given a vehicle, the learner will use the correct puller to remove the vibration damper without damage and in stated flat rate time.

b. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. II

TASK

AE-14 Removing front cover

PERFORMANCE OBJECTIVE

Remove the time chain cover

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Front cover designs
b. Steps in removal procedures
c. Front cover inspection
d. Removing old seals

Provide Demonstration On:

a. Locating all cover bolts
b. Cleaning cover
c. Removing old seal

Provide Practical Application On:

Removing, cleaning, and inspecting timing cover

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Glenn
b. Stockel (1)(2)

Student Manuals:

Oklahoma, *Auto Mechanics II*

Tools and Equipment:

a. Automobile engine in chassis
b. Shop manual
c. Assorted hand tools
d. Punch or chisel

CLASSROOM HOURS

2

EVALUATION (AE-14)

a. Given a vehicle, the learner will remove the front cover from the engine and inspect. This must be done within stated flat rate time and without damage to parts.

b. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

TASK

AE-15 Removing and replacing timing chain(s) and/or gears

PERFORMANCE OBJECTIVE

Remove and replace the timing chain and gears.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Timing chain and gear arrangements
b. Timing chain and gear removal
c. Timing chain and gear alignment

Provide Demonstration On:

a. Pulling gears
b. Installing gears

Provide Practical Application On:

Removing and replacing timing chain gears

Related Instruction:

Tasks: RI-01-03; RI-05-07; RI-11; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Glenn
b. Stockel (1)(2)

A/Vs:

Georgia Auto Mechanics Program (Slide set 211-13)

Student Manuals:

Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Automotive engine in chassis
b. Shop manual
c. Assorted hand tools
d. Torque wrench

CLASSROOM HOURS

6

EVALUATION (AE-15)

a. Given a vehicle, the learner will remove and replace the timing chain and gears. Valve timing must meet manufacturer's specifications.

b. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

TASK

AE-16 Replacing front cover and seal

PERFORMANCE OBJECTIVE

Replace the front cover and seal.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Seals
b. Seal installation
c. Use of seal installation tools
d. Using centering tool

Provide Demonstration On:

a. How to use the seal installation tool
b. How to use centering tool

Provide Practical Application On:

Install seal in cover and reinstall cover on engine

Related Instruction:

Tasks: RI-01-03; RI-05; RI-10-11

INSTRUCTIONAL MATERIALS

Textbooks:

Glenn

Student Manuals:

Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Automotive engine in chassis
b. Shop manual
c. Assorted hand tools
d. Seal installation kit
e. Centering tool
f. Torque wrench

CLASSROOM HOURS

2

EVALUATION (AE-16)

a. Given a vehicle, the learner will install a new seal. No visible oil leaks will be present when engine is run for fifteen minutes.

b. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

TASK

AE-17 Diagnosing timing chain problems

PERFORMANCE OBJECTIVE

Formulate a plan for locating problems and their cause in the timing chain and gear train.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Timing chain inspection
b. Timing gear inspection
c. Back lash
d. Reduced engine performance

Provide Demonstration On:

a. Ways of checking back lash
b. Gear inspection procedures
c. Nosies
d. Checking valve timing

Provide Practical Application On:

Use the trouble-shooting plan to locate a problem and its cause in a engine with a faulty timing chain and/or gears

Related Instruction:

Tasks: RI-01; RI-03-05; RI-07; RI-10-11; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Glenn
b. Stockel (1)(2)

Student Manuals:

Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Automobile engine in chassis
b. Shop manual,
c. Assorted hand tools

CLASSROOM HOURS 2

EVALUATION (AE-17)

a. Given a vehicle with a faulty timing chain and/or gears, the learner will describe a troubleshooting plan and locate the problem and cause. The plan must lead the learner to the cause of the problem within established flat rate time.

b. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

TASK

AE-18 Removing engine from vehicle

PERFORMANCE OBJECTIVE

Remove complete engine from vehicle.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Safety
b. Draining radiator and block
c. Removing component parts and accessories
d. Storing all component parts

Provide Demonstration On:

a. Use of engine lift
b. Sealing component parts (air conditioning, power steering, etc.)

Provide Practical Application On:

Have learner remove six or eight cylincer engine from vehicle

Related Instructions:

Tasks: RI-01; RI-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

Stockel (2)

A/Vs:

Georgia Auto Mechanics Program (Slide set 211-3)

Student Manuals:

a. Georgia Auto Mechanics Program (211-3)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Vehicle
b. Auto mechanics tools
c. Engine lift
d. Drain pans
e. Storage space or bins
f. Shop manual

CLASSROOM HOURS 6

EVALUATION (AE-18)

a. Given a vehicle with faulty engine, tools and equipment the, learner will remove engine from vehicle without causing damage and within double the flat rate time.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Textbooks have questions included

d. Oklahoma, Auto Mechanics II

e. V'TECS, Automotive Mechanics; Task No. 18

TASK

AE-19 Removing and inspecting usable parts

PERFORMANCE OBJECTIVE

Removing and inspecting usable parts.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Method of cleaning and inspecting all parts
b. Cleaning solutions (toxic & caustic)
c. Storing all parts
d. Removing only necessary parts for short block replacement
e. Inspecting usability of parts

Provide Demonstration On:

a. Use of steam cleaner and cleaning vat
b. Using vibration damper puller
c. Parts inspection

Provide Practical Application On:

Removing only those parts necessary for short block replacement

Related Instructions:

Tasks: RI-01; RI-03; RI-05-07; RI-11-12; RI-14

INSTRUCTIONAL MATERIALS

Textbooks:

Stockel (2)

A/Vs:

a. Bergwall, "The Internal Combustion Engine Explained" (Filmstrip #1)
b. Prentice-Hall, "Automobile Engine Overhaul" (Filmstrip #1)

Student Manuals:

Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Auto engine
b. Steam jenny
c. Cleaning vat
d. Storage bins
e. Auto mechanics tools common to task
f. Shop manual

CLASSROOM HOURS 8

EVALUATION (AE-19)

a. Given an automotive engine, tools and equipment, the learner will remove, clean and inspect all parts required for short block replacement. All parts not meeting manufacturer's specifications must be identified.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Oklahoma, Auto Mechanics II

d. Textbooks have questions included

e. V'TECS, Automotive Mechanics; Task No. 3, 4

f. Bergwall, filmstrip questions

TASK

AE-20 Assembling new and used parts on block assembly

PERFORMANCE OBJECTIVE

Assemble short block assembly using new and used parts.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Use of torque wrenches
b. Use of gasket sealants
c. Installing distributor
d. Adjusting all belts
e. Use of measuring tools
f. Valve train adjustments
g. Importance of pre-oiling

Provide Demonstration On:

a. Use of torque wrench
b. Belt tension gauge
c. Installing distributor
d. Adjusting valves
e. Pre-oiling

Provide Practical Application On:

Have learner assemble short block assembly in preparation for installation

Related Instructions:

Tasks: RI-01-03; RI-05; RI-07
RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

Stockel (2)

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 211-18)
b. Prentice-Hall, "Automobile Engine Overhaul" (Filmstrip #10)

Student Manuals:

a. Georgia Auto Mechanics Program (211-18)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Auto mechanics tools
b. Torque wrench
c. Belt tension guage
d. Shop manual

CLASSROOM HOURS 12

EVALUATION (AE-20)

a. Given an automotive short block, tools and equipment the, learner will install necessary parts on short block assembly and make ready for installation into automobile. All manufacturer's specifications must be met.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Textbooks have questions included

d. Oklahoma, Auto Mechanics II

e. V'TECS, Automotive Mechanics; Task No. 12, 24, 25, 31, 32

TASK

AE-21 Installing engine assembly

PERFORMANCE OBJECTIVE

Install engine and prepare for run-up test

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Use of engine hoist
b. Aligning component parts
c. Necessary adjustments (linkage to carburetor and transmission)
d. Filling radiator
e. Engine oil and filter

Provide Demonstration On:

a. Use of engine hoist
b. Filling radiator
c. Checking transmission linkage

Provide Practical Application On:

Installing engine assembly in automobile

Related Instructions:

Tasks: RI-01; RI-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

(None identified)

A/Vs:

Georgia Auto Mechanics Program (Slide set 211-19)

Student Manuals:

a. Georgia Auto Mechanics Program (211-19)
b. Oklahoma, *Auto Mechanics II*

Tools and Equipment:

a. Engine hoist
b. Auto mechanics tools
c. Transmission fluid or grease
d. Engine oil
e. Anti-freeze
f. Shop manual

CLASSROOM HOURS

8

EVALUATION (AE-21)

a. Given an engine assembly, and necessary tools and equipment, the learner will install engine. All connections and installation must meet manufacturer's specifications. All work must be done in double the flat rate time.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Oklahoma, Auto Mechanics II

TASK

AE-22 Testing engine assembly

PERFORMANCE OBJECTIVE

Test run engine and check out for any problems caused by improper assembly or installation procedures.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Pre-oiling
b. Initial start up checks
c. Monitering oil pressure and temperature
d. Running RPM

Provide Demonstration On:

a. Pre-oiling
b. Cranking and starting
c. Setting RPM

Provide Practical Application On:

Have learner test run an engine (engine can be newly installed or set up)

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-07; RI-14-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (1)
b. Stockel (2)

A/Vs:

Bergwall, "How to Overhaul an Engine" (Filmstrip #6)

Student Manuals:

Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Pressure oiling tank
b. Remote starter switch
c. Tachometer
d. Shop manual

CLASSROOM HOURS 2

EVALUATION (AE-22)

a. Given an automobile and necessary tools and equipment, the learner will test run and make all operational checks. Performance checks must be the same as known conditions.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Textbooks have questions included

d. Oklahoma, Auto Mechanics II

e. V'TECS, Automotive Mechanics; Task No. 17

f. Bergwall, filmstrip questions

TASK

AE-23 Diagnosing internal engine problems

PERFORMANCE OBJECTIVE

Develop a troubleshooting plan for locating internal mechanical problems of the automotive engine.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Diagnostic equipment common to automotive trade
b. Types and kinds of noises
c. Oil and water leaks
d. Performance of engine

Provide Demonstration On:

a. Use of diagnostic equipment
b. Locating problems by hearing, sight and touch

Provide Practical Application On:

Diagnosing bearing knocks, piston slap

Related Instruction:

Tasks: RI-01; RI-03-06; RI-07; RI-11; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (1)
b. Stockel (2)

A/Vs:

a. Georgia Auto Mechanics Program (Filmstrip 211-20A, B)
b. Bergwall, "Problems of the Internal Combustion Engine Explained" (Filmstrips 1-4)

Student Manuals:

a. Georgia Auto Mechanics Program (211-20)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Diagnostic equipment
b. Shop manual

CLASSROOM HOURS

4

EVALUATION (AE-23)

a. Given a vehicle with internal engine problems and necessary tools and equipment, the learner will develop a trouble shooting plan and locate the problem in double the flat rate time.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Textbooks have questions included.

d. Oklahoma, Auto Mechanics II

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics; Vol. I, II.

f. Bergwall, filmstrip questions

TASK

AE-24 Disassembling gas engine

PERFORMANCE OBJECTIVE

Disassemble complete automotive engine.

INSTRUCTIONAL ACTIVITIES

Prerequisite Tasks:

AE-01 through AE-23

Provide Information On:

a. Removing distributor
b. Removing cylinder heads
c. Removing harmonic balancer
d. Removing remaining external components
e. Removing internal components
f. Removing cam bearings
g. Importance of numbering rods, pistons and main bearing caps

Provide Demonstration On:

a. Removing harmonic balancer
b. Numbering rods, pistons and main bearing caps

Provide Practical Application On:

Completely disassemble automative gas engine including removing cam bearings

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (1)
b. Stockel (2)

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 211-1; Filmstrips 251-1 A, B)
b. Prentice-Hall, "The Basic Engine" (Filmstrip #1, 2); "Automobile Engine Overhaul" (Filmstrip #1, 2, 3)
c. Bergwall, "The Internal Combustion Engine Explained" (Filmstrip #1)

Student Manuals:

a. Georgia Auto Mechanics Program (211-1, 251-1)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Handtools
b. Safety glasses
c. Puller
d. Number stamp set
e. Shop manual

CLASSROOM HOURS

15

EVALUATION (AE-24)

a. Given an automotive gas engine, the learner will completely disassemble engine without damage to parts. All parts must be identified and function described.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Textbooks have questions included

d. Oklahoma, Auto Mechanics II

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

f. V'TECS, Automotive Mechanics; Task No. 6

TASK

AE-25 Cleaning and inspecting block and components

PERFORMANCE OBJECTIVE

Steam clean engine, wash parts and inspect.

INSTRUCTIONAL ACTIVITIES

Prerequisite Tasks:

AE-01 through AE-23

Provide Information On:

a. Steam cleaner use
b. Parts cleaning techniques
c. Gasket removal
d. Parts inspection
e. Measuring crankshaft and block for wear
f. Checking water and oil galleries

Provide Demonstration On:

a. Using steam cleaner
b. Visual inspection
c. Using micrometers to measure parts

Provide Practical Application On:

a. Cleaning engine block and components
b. Measuring cylinder and piston wear
c. Measuring crankshaft
d. Inspecting all components

Related Instruction:

Tasks: RI-01; RI-03; RI-05-06; RI-14

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (1)
b. Stockel (2)

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 211-4, 211-10A; Filmloop 211-10B)
b. Prentice-Hall, "Automobile Engine Overhaul" (Filmstrip #4, 5, 6)
c. Ford, "Gasoline Engines-Repair Techniques" (Filmstrip 2101-520)

Student Manuals:

a. Georgia Auto Mechanics Program (211-4, 211-10)
b. Oklahoma, Auto Mechanics II
c. Ford, "Gasoline Engine-Repair Techniques" (2101-520)

Tools and Equipment:

continued on back

CLASSROOM HOURS 15

EVALUATION (AE-25)

a. Given disassembled engine and necessary tools and equipment, the learner will clean and inspect cylinder block and all component parts. All defective parts must be identified and all measurements must be within .002" of the instructor's readings.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Textbooks have questions included

d. Oklahoma, Auto Mechanics II

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

f. V'TECS, Automotive Mechanics; Task No. 3, 14

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Steam cleaner
b. Parts cleaner
c. Crankshaft and block
d. Micrometers (inside and outside)
e. Service manual

TASK

AE-26 Preparing cylinder block

PERFORMANCE OBJECTIVE

Remove ridge and hone cylinders.

INSTRUCTIONAL ACTIVITIES

Prerequisite Tasks:

AE-01 through AE-23

Provide Information On:

a. Necessity of removing top ridge and honing cylinders
b. Using ridge reamer and cylinder hone
c. Safety while handling tools
d. Cleaning after honing (hot water and soap)

Provide Demonstration On:

Removing ridge and honing cylinders

Provide Practical Application On:

Removing ridge and honing cylinders

Related Instruction:

Tasks: RI-01; RI-03; RI-05-07; RI-11-12; RI-14

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (1)
b. Stockel (2)

A/Vs:

a. Georgia Auto Mechanics (Slide set 211-11A; Film-loop 211-11B, C)
b. Prentice-Hall, "Automobile Engine Overhaul" (Film-strip #4)

Student Manuals:

a. Georgia Auto Mechanics (211-11)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Cylinder block
b. Ridge reamer
c. Cylinder hone and oil
d. Service manual

CLASSROOM HOURS

10

EVALUATION (AE-26)

a. Given an automotive cylinder block and necessary tools and equipment, the learner will cut the ridge out without damaging cylinder and hone the cylinder to form a cross hatch pattern as pictured in the textbook.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Textbooks have questions included.

d. Oklahoma, Auto Mechanics II

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II.

TASK

AE-27 Installing cam bearings

PERFORMANCE OBJECTIVE

Install cam bearings in an automotive engine block.

INSTRUCTIONAL ACTIVITIES

Prerequisite Tasks:

AE-01 through AE-23

Provide Information On:

a. Cam bearings
b. Cam bearing construction
c. Installation tools
d. Sequence of installation
e. Oil hole alignment

Provide Demonstration On:

Installing cam bearings

Provide Practical Application On:

Install cam bearings

Related Instruction:

Tasks: RI-01-03; RI-05-07; RI-11-12; RI-14

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (1)
b. Stockel (2)

A/Vs:

Prentice-Hall, "Automobile Engine Overhaul" (Flimstrip #8)

Student Manuals:

Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Engine block and camshaft
b. Cam bearings
c. Installation tool
d. Service manual

CLASSROOM HOURS 4

EVALUATION (AE-27)

a. Given an engine block, cam bearings, and necessary tools and equipment, the learner will replace cam bearings to manufacturer's specifications.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Textbooks have questions included.

d. Oklahoma, Auto Mechanics II

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II.

f. V'TECS, Automotive Mechanics; Task No. 22

TASK

AE-28 Installing piston pins and rings

PERFORMANCE OBJECTIVE

Fit pistons to rods and install piston rings.

INSTRUCTIONAL ACTIVITIES

Prerequisite Tasks:

AE-01 through AE-23

Provide Information On:

a. Piston pin fit
b. Installing pins
c. Compression rings
d. Oil rings
e. Cleaning ring grooves
f. Installing rings in proper order
g. Ring end gap placement

Provide Demonstration On:

a. Installing piston pins
b. Cleaning ring grooves
c. Installing rings

Provide Practical Application On:

a. Installing pistons on rods and cleaning ring grooves
b. Installing piston rings

Related Instruction:

Tasks: RI-01-03; RI-05-07; RI-10-11; RI-14

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (1)
b. Stockel (2)

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 211-9A, 102-3; Filmloop 211-9B, C, D)
b. Prentice-Hall, "Automobile Engine Overhaul" (Filmstrip #6, 7)
c. Ford, "Gasoline Engines-Piston Ring Service (Filmloop 2101-501)

Student Manuals:

a. Georgia Auto Mechanics Program (211-9, 251-3)
b. Oklahoma, Auto Mechanics II
c. Ford, "Gasoline Engines-Piston Ring Service" (2101-501)

Tools and Equipment:

continued on back

CLASSROOM HOURS

10

EVALUATION (AE-28)

a. Given a set of pistons, rods and rings and necessary tools and equipment, the learner will fit pistons to rods and install piston rings without damage and to manufacturer's specifications.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Textbooks have questions included.

d. Oklahoma, Auto Mechanics II

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II.

f. V'TECS, Automotive Mechanics; Task No. 7, 26

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Ring groove cleaner
b. Piston vise
c. Pistons and rods
d. Piston rings
e. Service manual

TASK

AE-29 Installing the crankshaft

PERFORMANCE OBJECTIVE

Install mainbearings and crankshaft.

INSTRUCTIONAL ACTIVITIES

Prerequisite Tasks:

AE-01 through AE-23

Provide Information On:

a. Bearing construction
b. Crankshaft construction
c. Rear oil seal installation
d. Bearing installation
e. Pre-oiling bearings
f. Installing crankshaft
g. Replacing main bearing caps in correct order
h. Importance of torquing cap screws

Provide Demonstration On:

a. Bearing, seal and crankshaft installation
b. Torquing cap screws

Provide Practical Application On:

a. Installing mainbearings, seal and crankshaft
b. Torquing to correct specifications

Related Instruction:

Tasks: RI-01-03; RI-05-07; RI-10-11, RI-14

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (1)
b. Stockel (2)

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 211-12A, 211-13; Filmloop 211-12B)
b. Prentice-Hall, "Automobile Engine Overhaul" (Filmstrip #5)

Student Manuals:

a. Georgia Auto Mechanics Program (211-12, 211-13)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Engine block
b. Crankshaft, bearings & seals
c. Handtools
d. Torque wrench
e. Service manual

CLASSROOM HOURS 4

EVALUATION (AE-29)

a. Given an engine block, crankshaft, bearings and seals and necessary tools and equipment, the learner will install the crankshaft and bearings. Upon completion the shaft must turn freely and main bearing cap torque must be within manufacturer's specifications.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Textbooks have questions included.

d. Oklahoma, Auto Mechanics II

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II.

f. V'TECS, Automotive Mechanics; Task No. 9

TASK

AE-30 Installing pistons and rod bearings

PERFORMANCE OBJECTIVE

Install pistons and connecting rods into block and bolt to crankshaft.

INSTRUCTIONAL ACTIVITIES

Prerequisite Tasks:

AE-01 through AE-23

Provide Information On:

a. Rod bearing construction
b. Correct alignment of ring end gaps
c. Proper positioning of pistons and rods
d. Aligning numbering on rods and marks on piston crown
e. Piston ring compressors
f. Pre-lubrication of piston, block and rings
g. Torquing rod bolts

Provide Demonstration On:

Installing piston and connecting rod

Provide Practical Application On:

a. Installing pistons and connecting rod
b. Torquing connecting rod

Related Instruction:

Tasks: RI-01-03; RI-05-07; RI-10-11; RI-14

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (1)
b. Stockel (2)

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 211-14A; Filmloop 211-14B0
b. Prentice-Hall (Filmstrip #7)

Student Manuals:

a. Georgia Auto Mechanics Program (211-14)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Engine block, pistons, rod bearings
b. Piston ring compressor
c. Oil
d. Hand tools
e. Torque wrench
f. Service manual

CLASSROOM HOURS

4

EVALUATION (AE-30)

a. Given an engine block and pistons with rods and necessary tools and equipment, the learner will install pistons and rods without damage and in accordance with manufacturer's specifications. Engine crankshaft must turn over smoothly without binding.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Textbooks have questions included.

d. Oklahoma, Auto Mechanics II

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II.

f. V'TECS, Automotive Mechanics; Task No. 19

TASK

AE-31 Installing oil pump, oil pan and component parts

PERFORMANCE OBJECTIVE

Assemble remaining parts of engine including oil pump, oil pan, etc.

INSTRUCTIONAL ACTIVITIES

Prerequisite Tasks:

AE-01 through AE-23

Provide Information On:

a. Pre-oiling pump
b. Oil pump construction
c. Oil pump screen
d. Oil pan and gasket
e. Installation of all remaining components
f. Importance of torquing

Provide Demonstration On:

Installation of oil pump

Provide Practical Application On:

Completing total assembly of engine

Related Instruction:

Tasks: RI-01-03; RI-05-07; RI-10-11; RI-14

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (1)
b. Stockel (2)

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 211-2, 211-18)
b. Prentice-Hall, "Automobile Engine Overhaul" (Filmstrip #9, 10)

Student Manuals:

a. Georgia Auto Mechanics Program (211-2, 211-18)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Partially assembled engine
b. Remaining parts
c. Hand tools
d. Torque wrench
e. Service manual

CLASSROOM HOURS 20

EVALUATION (AE-31)

a. Given an automobile engine with crankshaft and pistons installed, the learner will complete the assembly in double the flat rate time and in accordance with the manufacturer's specifications.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Textbooks have questions included.

d. Oklahoma, Auto Mechanics II

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II.

f. V'TECS, Automotive Mechanics, Task No. 12, 21, 24, 25

TASK

AE-32 Comparing the automotive gas and diesel engines

PERFORMANCE OBJECTIVE

Describe advantages and disadvantages of the diesel engine to the gas engine.

INSTRUCTIONAL ACTIVITIES

Prerequisite Tasks:

AE-01 through AE-31

Provide Information On:

a. Combustion chamber
b. Diesel components as compared to gas engine components
c. Diesel engine operation
d. Weight
e. Fuels and fuel systems
f. Spark and compression ignition
g. Compression ratios
h. Operating heat range
i. Two stroke diesel engines

Provide Demonstration On:

Identifying diesel engines by recognizing differences

Provide Practical Application On:

Have learner inspect cut-a-way models of diesel and gas engines of similar horsepower and record differences

INSTRUCTIONAL MATERIALS

Textbooks:

Weathers & Hunter

A/Vs:

a. Bergwall, "The Four-Cycle Diesel Engine Explained", (Filmstrip #1, 2)
b. Prentice-Hall, "Introduction to the Diesel Engine" (Filmstrip #1, 2)

Student Manuals:

Oklahoma, Diesel Engine Mechanics

Tools and Equipment:

a. Cut-a-way diesel engine
b. Cut-a-way gas engine
c. Fuel and ignition system components

CLASSROOM HOURS

8

EVALUATION (AE-32)

a. Given cut-a-way diesel and gas engines and diagrams, the learner will locate and describe the operational differences between the engines and list the advantages and disadvantages of each. 70% accuracy is required.

b. Oklahoma, Diesel Engine Mechanics

TASK

AE-33 Performing the cylinder compression and leakage test

PERFORMANCE OBJECTIVE

Measure and record the cylinder compression and leak down rate.

INSTRUCTIONAL ACTIVITIES

Prerequisite Tasks:

AE-01 through AE-31

Provide Information On:

a. Compression pressures
b. Specified pressures and actual pressures
c. Causes of low compression
d. Diesel engine compression testers
e. Compression test procedures

Provide Demonstration On:

Using the compression tester

Provide Practical Application On:

Making a compression test and analyzing the results

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-07; RI-14-15

INSTRUCTIONAL MATERIALS

Textbooks:

Weathers & Hunter

A/Vs:

Prentice-Hall, "Servicing the G.M. 5.7 Litre Diesel Engine", (Filmstrip #4)

Student Manuals:

Oklahoma, Diesel Engine Mechanics

Tools and Equipment:

a. Diesel compression tester
b. Hand tools
c. Automotive diesel engine
d. Service manual

CLASSROOM HOURS

8

EVALUATION (AE-33)

a. Given an automotive diesel engine and necessary tools and equipment, the learner will measure and record the compression on each cylinder. Readings must be within 10% of known values.

b. Oklahoma, Diesel Engine Mechanics

TASK

AE-34 Removing and replacing the fuel injectors

PERFORMANCE OBJECTIVE

Remove, test and replace the fuel injector.

INSTRUCTIONAL ACTIVITIES

Prerequisite Tasks:

AE-01 through AE-31

Provide Information On:

a. Diesel fuels
b. Fuel filters
c. Fuel injection system
d. Injection pump
e. Injection nozzles
f. Cleanliness
g. Safety
h. Injection timing
i. Injector test equipment
j. Opening pressure
k. Leakage
l. Spray pattern

Provide Demonstration On:

Removing, testing and replacing the injector

Provide Practical Application On:

Removing, testing and replacing the injector on an automotive diesel engine.

Related Instruction:

Tasks: RI-0o-03; RI-05-07; RI-09; RI-11; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

Weathers & Hunter

A/Vs:

Prentice-Hall, "Servicing the G.M. 5.7 Litre Diesel Engine", (Filmstrip #3)

Student Manuals:

Oklahoma, Diesel Engine Mechanics

Tools and Equipment:

a. Hand tools
b. Automotive deisel engine
c. Injector test equipment
d. Injectors
e. Fuel filters
f. Fuel pumps
g. Service manual

CLASSROOM HOURS 15

EVALUATION (AE-34)

a. Given an automotive diesel engine and necessary tools and equipment, the learner will remove an injector, test and reinstall according to manufacturer's specifications. The learner must determine if the injector is servicable or not.

b. Oklahoma, Diesel Engine Mechanics

TASK

AE-35 Removing and replacing the fuel injection pump

PERFORMANCE OBJECTIVE

Remove, test and replace the fuel injection pump.

INSTRUCTIONAL ACTIVITIES

Prerequisite Tasks:

AE-01 through AE-31

Provide Information On:

a. Storing fuel
b. Filtering fuel
c. Pumping Fuel
d. Injecting fuel
e. Advancing and retarding fuel injection
f. Governing engine speed
g. Multi-power pump types
h. Distributor pump types

Provide Demonstration On:

Removing, testing and replacing the fuel injector pump

Provide Practical Application On:

Removing, testing and replacing the fuel injector pump on a automotive diesel engine

Related Instruction:

Tasks: RI-01-03; RI-05-07; RI-09; RI-11; RI-;5

INSTRUCTIONAL MATERIALS

Textbooks:

Weathers & Hunter

A/Vs:

a. Bergwall, "The Four-Cycle Diesel Engine Explained", (Filmstrip #3)
b. Prentice-Hall, "Servicing the G.M. 5.7 Litre Diesel Engine", (Filmstrip #7, 8)

Student Manuals:

Oklahoma, Diesel Engine Mechanics

Tools and Equipment:

a. Hand tools
b. Manufacturer's special tools
c. Automotive diesel engine

CLASSROOM HOURS

18

EVALUATION (AE-35)

a. Given an automotive diesel engine and necessary tools and equipment, the learner will remove, test and replace the fuel injection pump according to manufacturer's specifications. Timing, governor settings and fuel flow must be within 10% of recommended values.

b. Oklahoma, Diesel Engine Mechanics

TASK

AE-36 Removing and replacing the turbocharger

PERFORMANCE OBJECTIVE

Remove, inpsect and replace the turbocharger

INSTRUCTIONAL ACTIVITIES

Prerequisite Tasks:

AE-01 through AE-31

Provide Information On:

a. Supercharger
b. Turbocharger
c. Adyantages
d. Turbine wheels
e. Compressing of air
f. Materials and methods of construction

Provide Demonstration On:

Removing, disassembly, inspecting and replacing the turbocharger

Provide Practical Application On:

Removing, disassembly, inspection and replacing the automotive diesel turbocharger

Related Instruction:

Tasks: RI-01-03; RI-05; RI-07; RI-11; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

Weathers & Hunter

Student Manuals:

Oklahoma, Diesel Engine Mechanics

Tools and Equipment:

a. Hand tools
b. Turbo charged automotive diesel
c. Service manual

CLASSROOM HOURS 18

EVALUATION (AE-36)

a. Given a turbocharged automotive diesel engine and necessary tools and equipment, the learner will remove, inspect and replace the turbocharger according to manufacturer's specifications. Upon completion the turbocharger must operate without vibration or erratic noise.

b. Oklahoma, Diesel Engine Mechanics

TASK

AE-37 Removing the engine from the vehicle

PERFORMANCE OBJECTIVE

Remove an automotive diesel engine from the vehicle.

INSTRUCTIONAL ACTIVITIES

Prerequisite Tasks:

AE-01 through AE-31

Provide Information On:

a. Safety
b. Draining radiator and block
c. Storing component parts
d. Removal procedures

Provide Demonstration On:

a. Use of engine lift
b. Sealing off components

Provide Practical Application On:

Have learner remove an automotive diesel engine from a vehicle

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Hand tools
b. Lifting equipment
c. Service manual
d. Drain pans
e. Storage bins

CLASSROOM HOURS

18

EVALUATION (AE-37)

a. Given an automotive diesel engine and necessary tools and equipment, the learner will remove the engine without damaging components and in double the flat rate time.

b. Oklahoma, Diesel Engine Mechanics

TASK

AE-38 Disassembling and inspection of the engine

PERFORMANCE OBJECTIVE

Disassemble and inspect component parts of an automotive diesel engine.

INSTRUCTIONAL ACTIVITIES

Prerequisite Tasks:

AE-01 through AE-31

Provide Information On:

a. Similarities between diesel and gas engine parts inspection
b. Parts removal
c. Methods of cleaning and inspecting block and component parts
d. Using micrometers
e. Inspecting the block
f. Inspecting the internal parts
g. Inspecting the external parts

Provide Demonstration On:

Disassembly and inspection of engine

Provide Practical Application On:

a. Removing component parts
b. Cleaning and inspection of block, pistons, crankshaft, camshaft, etc.

Related Instruction:

Tasks: RI-01; RI-03; RI-05-07; RI-11; RI-14

INSTRUCTIONAL MATERIALS

Textbooks:

Weathers & Hunter

Student Manuals:

Oklahoma, Diesel Engine Mechanics

Tools and Equipment:

a. Hand tools
b. Precision measurement tools
c. Automotive diesel engine
d. Service manual

CLASSROOM HOURS 18

EVALUATION (AE-38)

a. Given an automotive diesel engine and necessary tools and equipment, the learner will disassemble and inspect the component parts for wear and/or damage. Identification of all unusable parts must be made and all micrometer readings must be within .002 of the instructors specifications.

b. Oklahoma, Diesel Engine Mechanics

TASK

AE-39 Rebuilding the automotive diesel engine

PERFORMANCE OBJECTIVE

Prepare and assemble the block, internal parts, heads and component parts.

INSTRUCTIONAL ACTIVITIES

Prerequisite Tasks:

AE-01 through AE-31

Provide Information On:

a. Clogged cooling passages
b. Honing cylinder walls
c. Removing cylinder ridges
d. Installing piston rings and pins
e. Installing crankshaft, pistons and rods
f. Valve service
h. Installing heads
i. Assembling remaining parts

Provide Demonstration On:

a. Honing
b. Ridge reaming
c. Installing rings
d. Installing heads

Provide Practical Application On:

Rebuild an automotive diesel engine

Related Instruction:

Tasks: RI-01; RI-03; RI-05-07; RI-09-12; RI-14-15

INSTRUCTIONAL MATERIALS

Textbooks:

Weathers & Hunter

Student Manuals:

Oklahoma, Diesel Engine Mechanics

Tools and Equipment:

a. Hand tools
b. Special tools
c. Automotive diesel engine
d. Service manual

CLASSROOM HOURS 28

EVALUATION (AE-39)

a. Given an automotive diesel engine and necessary tools and equipment, the learner will prepare the block and assemble the engine according to manufacturer's specifications. When test run the engine must perform within manufacturer's tolerances.

b. Oklahoma, Diesel Engine Mechanics

TASK

AE-40 Installing the automotive diesel engine

PERFORMANCE OBJECTIVE

Install the engine and hook-up all accessories.

INSTRUCTIONAL ACTIVITIES

Prerequisite Tasks:

AE-01 through AE-31

Provide Information On:

a. Safety
b. Proper lifting
c. Aligning component parts
d. Necessary adjustments
e. Filling with water
f. Pre-oiling

Provide Demonstration On:

a. Use of hoist
b. Filling radiator and bleeding off air
c. Checking linkage hook-up

Provide Practical Application On:

Installing an automotive diesel engine in vehicle

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Engine hoist
b. Mechanics tools
c. Service manual

CLASSROOM HOURS 18

EVALUATION (AE-40)

Given an automotive diesel engine and necessary tools and equipment, the learner will install the engine in accordance with manufacturer's specifications and in double the flat rate time.

TASK

AE-41 Testing the automotive diesel engine

PERFORMANCE OBJECTIVE

Test run engine and check out for any problems caused by improper assembly or installation procedures.

INSTRUCTIONAL ACTIVITIES

Prerequisite Tasks:

AE-01 through AE-31

Provide Information On:

a. Pre-start-up inspection
b. Initial start-up checks
c. Monitering oil pressure and temperature
d. Diesel run-a-way
e. Running RPM
f. Break-in procedures
g. Retorquing heads
h. Final valve and fuel injection adjustments

Provide Demonstration On:

a. Cranking and starting
b. Setting rpm

Provide Practical Application On:

Test running an engine (newly installed or set-up)

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-07; RI-15

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Remote starter switch
b. Hand tools
c. Tachometer
d. Dynamometer
e. Service manual

CLASSROOM HOURS 8

EVALUATION (AE-41)

Given an automobile with a diesel engine and necessary tools and equipment, the learner will test run and make all necessary checks and adjustments in accordance with manufacturer's specifications. Oil leaks, water leaks, fuel system malfunctions, or starting problems must be identified.

TASK

AE-42 Diagnosing automotive diesel engine problems

PERFORMANCE OBJECTIVE

Develop a troubleshooting plan for locating problems in the automotive diesel engine.

INSTRUCTIONAL ACTIVITIES

Prerequisite Tasks:

AE-01 through AE-41

Provide Information On:

a. Diesel fuel system diagnoses
b. Diesel electrical system diagnoses
c. Diesel exhaust system diagnoses
d. Diesel cooling system diagnoses
e. Diesel valve train diagnoses
f. Internal engine noises

Provide Demonstration On:

Locating engine misfire or low power due to fuel system and/or air intake problems

Provide Practical Application On:

Developing a diagnostic plan and applying it to an engine with known problems

Related Instruction:

Tasks: RI-01; RI-03-05; RI-07-11; RI-14-15

INSTRUCTIONAL MATERIALS

Textbooks:

Weathers & Hunter

A/Vs:

Prentice-Hall, "Servicing the G.M. 5.7 Litre Diesel Engine", (Filmstrip #1, 2, 3)

Student Manuals:

Oklahoma, Diesel Engine Mechanics

Tools and Equipment:

a. Diagnostic equipment
b. Dynamometer
c. Hand tools and special tools
d. Service manual

CLASSROOM HOURS	8

EVALUATION (AE-42)

a. Given an automotive diesel engine with known problems and necessary tools and equipment, the learner will develop a troubleshooting plan and locate the cause of trouble in double the flat rate time.

b. Oklahoma, Diesel Engine Mechanics

TASK

AA-01 Replacing wiring and making splices

PERFORMANCE OBJECTIVE

Replace wiring and make splices.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Wire gauges
b. Conductive of different types of wires
c. Types of solder
d. Types of flux
e. Types of splices
f. Solder irons
g. Solderless connections
h. Reading wiring diagrams

Provide Demonstration On:

a. Splicing techniques
b. Use of soldering iron
c. Electrical tape use
d. Wiring solderless connectors
e. Reading a wiring diagram

Provide Practical Application On:

a. Splicing wires
b. Soldering wires
c. Replacing repaired wires
d. Making solderless connections
e. Locating wires by using a wiring diagram

Related Instructions:

Tasks: RI_01-03; RI-05; RI-08
RI-13-14

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (2)
b. Remling (1)
c. Stockel (2)

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 201-2)
b. Ford "Electrical Systems..." (Slide set 3000-215)
c. Prentice Hall "Electric Wiring Procedures" (Filmstrip #5)

Student Manuals:

a. Georgia Auto Mechanics Program (201-2)
b. Oklahoma, Auto Mechanics II
c. Ford "Electrical Systems..." (3000-218)

Tools and Equipment:

a. Soldering iron
b. Wire stripping tool
c. Wiring diagrams
d. Solderless connectors and tool

CLASSROOM HOURS

4

EVALUATION (AA-01)

a. Given necessary tools and equipment, the learner will locate a wire using the diagram and splice the wire checking to insure maximum current flow through splices and connections. All splices and connections must meet standards set by Automobile manufacturers.

b. Crouse, The Auto Book & Auto Study Guide

c. Ford, Automotive Electrical Circuits (1300.1)

d. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

e. V'TECS, Automotive Mechanics; Task No. 95

f. Textbooks have questions included.

TASK

AA-02 Testing and maintaining electrical protection devices

PERFORMANCE OBJECTIVE

Test and replace circuit breakers and fusible links.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Breakers
b. Fusible links
c. Charging system principles
d. Basic electricity

Provide Demonstration On:

a. Checking system with defective circuit breaker
b. Checking charging system with faulty fusible link

Provide Practical Application On:

a. Locating circuit breakers
b. Locating fusible links
c. Testing circuit breakers
d. Replacing protection devices

Related Instructions:

Tasks: RI-01; RI-03; RI-08

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (2)
b. Remling (1)
c. Toboldt & Johnson

A/Vs:

Georgia Auto Mechanics Program (Slide set 243-4)

Student Manuals:

a. Georgia Auto Mechanics Program (243-4)
b. Ellinger, Automotive Electrical Systems

Tools and Equipment:

a. Service Manual
b. Hand tools
c. VOM
d. Test light

CLASSROOM HOURS 10

EVALUATION (AA-02)

a. Given an automotive electrical system and tools and equipment, the learner will test lighting and charging circuit wiring and detect inoperable fusible links and circuit protectors. All repairs must comply with manufacturer's specifications.

b. Ellinger, Automotive Electrical Systems.

c. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II.

d. Textbooks have questions included.

TASK

AA-03 Testing and repairing the courtesy light

PERFORMANCE OBJECTIVE

Test and repair courtesy light circuit.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Basic electricity
b. Fuses
c. Light switches
d. Electrical circuits

Provide Demonstration On:

a. Shorted fuse to courtesy light circuit
b. Loss of ground to courtesy light

Provide Practical Application On:

a. Determining cause of defective courtesy light circuit
b. Locating courtesy lamp
c. Locating courtesy lamp fuse

Related Instructions:

Tasks: RI-01; RI-03; RI-05; RI-08

INSTRUCTIONAL MATERIALS

Textbooks:

a. Remling (1)
b. Toboldt & Johnson

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 243-4; Filmstrip 201-1A, B, C)
b. Ford, "Electrical Systems ...: (Slide set 3000-220)

Student Manuals:

a. Georgia Auto Mechanics Program (201-1, 243-4)
b. Oklahoma, *Auto Mechanics II*

Tools and Equipment:

CLASSROOM HOURS

6

EVALUATION (AA-03)

a. Given an automobile and necessary tools and equipment, the learner will test and repair problems in the courtesy light circuit according to manufacturer's specifications.

b. V'TECS, Automotive Mechanics; Task No. 89

c. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

d. Textbooks include test questions.

TASK

AA-04 Testing and repairing the parking light circuit

PERFORMANCE OBJECTIVE

Test and repair the parking light circuit.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Parallel electrical circuits
b. Electricity fundamentals
c. Basic electrical theory
d. Filament types

Provide Demonstration On:

a. Types of circuits
b. Types of parking light bulbs
c. Use of volt/ohm meter
d. Light switches
e. Wiring diagrams

Provide Practical Application On:

a. Testing parallel circuits
b. Testing headlamp switches
c. Testing parking light circuits
d. Tracing wires using a schematic diagram

Related Instructions:

Tasks: RI-01; RI-03; RI-05; RI-08

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (2)
b. Remling (1)
c. Toboldt & Johnson

A/Vs:

Georgia Auto Mechanics Program (Slide set 243-4A, 243-4B)

Student Manuals:

a. Georgia Auto Mechanics Program (243-4)
b. Oklahoma, Auto Mechanics II
c. Ellinger, Automotive Electrical Systems

Tools and Equipment:

a. VOM
b. Test light
c. Automotive Shop Manual
d. Hand tools

CLASSROOM HOURS

6

EVALUATION (AA-04)

a. Given an automobile and necessary tools and equipment, the learner will check a parking light circuit from headlamp switch to parking light bulbs. All defects will be repaired according to manufacturer's specifications.

b. Oklahoma, Auto Mechanics; Vol. II

c. Ellinger, Automotive Electrical Systems

d. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

e. V'TECS, Automotive Mechanics; Task No. 89, 90

f. Textbooks include test questions.

TASK

AA-05 Testing and repairing the back-up light circuit

PERFORMANCE OBJECTIVE

Test and repair the back-up light circuit.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Electrical circuits
b. Troubleshooting electric circuits
c. Basic electrical theory
d. Back-up light switches and operation

Provide Demonstration On:

a. Types of circuits
b. Types of back-up light switches
c. Types of light bulbs
d. Wiring diagrams and their use

Provide Practical Application On:

a. Locating back-up light switch
b. Locating back-up light
c. Testing back-up light circuit
d. Tracing back-up light wires

Related Instructions:

Tasks: RI-01; RI-03; RI-05; RI-08

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (2)
b. Remling (1)
c. Toboldt & Johnson

A/Vs:

Georgia Auto Mechanics Program (Slide set 243-4A, 243-4B)

Student Manuals:

a. Georgia Auto Mechanics Program (243-4)
b. Oklahoma, Auto Mechanics II
c. Ellinger, Automotive Electrical Systems

Tools and Equipment:

a. VOM
b. Test light
c. Shop Manual
d. Hand tools
e. Soldering iron

CLASSROOM HOURS	6

EVALUATION (AA-05)

a. Given an automobile and necessary tools and equipment, the learner will check and repair back-up light circuit. All defects will be repaired according to manufacturer's specifications.

b. V'TECS, Automotive Mechanics; Task No. 89, 90

c. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

d. Oklahoma, Auto Mechanics; Vol. II

e. Textbooks include test questions.

TASK

A-06 Testing and repairing the headlight circuit

PERFORMANCE OBJECTIVE

Test and repair the headlamp circuit.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Electrical circuits
b. Electricity fundamentals
c. Electrical theory of headlight circuits
d. Headlight circuit components

Provide Demonstration On:

a. Headlight switch operation
b. Headlight switch removal
c. Wiring diagrams and their use
d. Dimmer switch operation

Provide Practical Application On:

a. Testing headlight switches
b. Testing headlight circuits
c. Locating dimmer switches
d. Testing dimmer switches

Related Instructions:

Tasks: RI-01; RI-03; RI-05; RI-08

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (2)
b. Remling (1)
c. Toboldt & Johnson

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 243-4A, 243-4B)
b. Prentice Hall, "Basic Automotive Service" (Filmstrip #1)

Student Manuals:

a. Georgia Auto Mechanics Program (243-4)
b. Oklahoma, Auto Mechanics II
c. Ellinger, Automotive Electrical Systems

Tools and Equipment:

a. VOM
b. Test light
c. Automotive Shop Manual
d. Hand tools
e. Soldering iron

CLASSROOM HOURS

6

EVALUATION (AA-06)

a. Given an automobile and necessary tools and equipment, the learner will troubleshoot and repair the headlamp circuit. All defects will be repaired according to manufacturer's specifications.

b. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

c. V'TECS, Automotive Mechanics; Task No. 89, 90

d. Ellinger, Automotive Electrical Systems

e. Oklahoma, Auto Mechanics; Vol. II

f. Textbooks include test questions.

TASK

AA-07 Testing and repairing the turn signal circuit

PERFORMANCE OBJECTIVE

Test and repair the turn signal circuit.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Turn signal types
b. Flasher types
c. Bulb filament types
d. Wiring diagrams

Provide Demonstration On:

a. Location of turn signal
b. Turn signal removal
c. Location of flasher
d. Test flasher
e. Test turn signal circuit

Provide Practical Application On:

a. Locating turn signal
b. Removing components for accessibility to turn signal
c. Locating flasher
d. Removing flasher
e. Testing turn signal circuit
f. Replacing bulbs

Related Instructions:

Tasks: RI-01; RI-03; RI-05; RI-08

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (2)
b. Remling (1)
c. Toboldt & Johnson

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 243-4A, 243-4B)
b. Prentice Hall, "Basic Automotive Service" (Film-strip #1)

Student Manuals:

a. Georgia Auto Mechanics Program (243-4)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Test light
b. VOM
c. Hand tools
d. Soldering iron

CLASSROOM HOURS 6

EVALUATION (AA-07)

a. Given an automobile and necessary tools and equipment, the learner will test, remove and replace the components of the turn signal circuit according to procedures found in the Auto Shop Manual.

b. V'TECS, Automotive Mechanics

c. Oklahoma, Auto Mechanics; Vol. II

d. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol I, II

e. Textbooks include test questions.

TASK

AA-08 Testing and repairing the brake light circuit

PERFORMANCE OBJECTIVE

Test and repair the brake light circuit.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Electrical circuits
b. Brake light switch fundamentals of operation

Provide Demonstration On:

a. Location of brake light switch
b. Use of test light
c. Location of wiring diagram needed

Provide Practical Application On:

a. Locating brake light switch
b. Locating problem in wiring circuit
c. Using test light
d. Tracing wires of brake light circuit

Related Instructions:

Tasks: RI-01; RI-03; RI-05; RI-08

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (2)
b. Remling (1)
c. Toboldt & Johnson

A/Vs:

Georgia Auto Mechanics Program (Slide set 243-4A, 243-4B)

Student Manuals:

a. Georgia Auto Mechanics Program (243-4)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Hand tools
b. Soldering iron
c. VOM
d. Test light

CLASSROOM HOURS 6

EVALUATION (AA-08)

a. Given an automobile and necessary tools and equipment, the learner will test components of the brake light circuit. The learner will demonstrate skills in using the VOM and test light to repair circuit to manufacturer's specifications.

b. Oklahoma, Auto Mechanics II

c. V-TECS, Automotive Mechanics; Task No. 89, 90

d. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

e. Textbooks include test questions.

TASK

AA-09 Testing and repairing the horn circuit

PERFORMANCE OBJECTIVE

Test and repair the components of the horn circuit.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Horn circuits
b. Horn components

Provide Demonstration On:

a. Location of horn
b. Location of horn ring and contact
c. Location of horn relay
d. Test circuit with voltmeter

Provide Practical Application On:

a. Troubleshooting horn system
b. Repairing or replacing horn ring or contact
c. Tuning horn
d. Testing and replacing relays

Related Instructions:

Tasks: RI-01; RI-03; RI-05; RI-08

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (2)
b. Toboldt & Johnson

A/Vs:

Georgia Auto Mechanics Program (Slide set 243-4A,B)

Student Manuals:

a. Georgia Auto Mechanics Program (243-4)
b. Oklahoma, *Auto Mechanics II*
c. Ellinger, *Automotive Electrical Systems*

Tools and Equipment:

a. Voltmeter
b. Jumper wire
c. Hand tools

CLASSROOM HOURS

6

EVALUATION (AA-09)

a. Given an automobile and necessary tools and equipment, the learner will test the horn circuit with the voltmeter. The learner will remove steering wheel or horn cover for accessibility to horn ring and contact and locate and remove the horn relay. The learner will repair the horn circuit to manufacturer's specifications.

b. V'TECS, Automotive Mechanics

c. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

d. Oklahoma, Auto Mechanics II

e. Textbooks include test questions.

TASK

AA-10 Testing and repairing the windshield wiper circuit

PERFORMANCE OBJECTIVE

Test and repair the windshield wiper circuit.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Windshield wiper electrical circuits
b. Windshield wiper motor types

Provide Demonstration On:

a. Windshield wiper switch removal
b. Windshield wiper motor removal
c. Circuit testing

Provide Practical Application On:

a. Testing windshield wiper motor circuit
b. Removing and replacing windshield wiper motor
c. Replacing windshield wiper switch

Related Instructions:

Tasks: RI-01; RI-03; RI-05; RI-10

INSTRUCTIONAL MATERIALS

Textbooks:

Toboldt & Johnson

A/Vs:

Georgia Auto Mechanics Program (Slide set 243-2A; Filmstrip 243-2B)

Student Manuals:

a. Georgia Auto Mechanics Program (243-2)
b. Oklahoma, Auto Mechanics II
c. Ellinger, Automotive Electrical Systems

Tools and Equipment:

a. VOM
b. Test light
c. Jumper lead
d. Hand tools

CLASSROOM HOURS 6

EVALUATION (AA-10)

a. Given an automobile and necessary tools and equipment, the learner will test and repair the components of the windshield wiper circuit and repair according to manufacturer's specifications.

b. Toboldt & Johnson, Automotive Encyclopedia

c. Ellinger, Automotive Electrical Systems

d. Oklahoma, Auto Mechanics II

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

f. V'TECS, Automotive Mechanics; Task No. 93

TASK

AA-11 Testing and repairing the windshield washer circuit

PERFORMANCE OBJECTIVE

Test and repair the windshield washer circuit.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Windshield washer pump operation
b. Pump electrical circuits
c. Pump water circuits

Provide Demonstration On:

a. Types of washer/wiper switches
b. Windshield washer pump disassembly
c. Windshield washer pump inspection
d. Test windshield washer pump electrical circuit

Provide Practical Application On:

a. Disassembling windshield washer pump
b. Inspecting windshield washer pump
c. Testing windshield washer electrical circuit

Related Instructions:

Tasks: RI-01; RI-03; RI-05; RI-08

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (2)
b. Toboldt & Johnson

A/Vs:

Georgia Auto Mechanics Program (Slide set 243-2A; Filmstrip 243-2B)

Student Manuals:

a. Georgia Auto Mechanics Program (243-2)
b. Oklahoma, Auto Mechanics II
c. Ellinger, Automotive Electrical Systems

Tools and Equipment:

a. Pressure tester
b. VOM
c. Test light
d. Hand tools
e. Shop Manual

CLASSROOM HOURS

8

EVALUATION (AA-11)

a. Given an automobile and necessary tools and equipment, the learner will test and repair switches and pumps of the windshield washer circuit according to manufacturer's specifications. The learner will aim pressure nozzles to exact location on the windshield for best results.

b. Crouse, The Auto Book & The Auto Study Guide

c. Toboldt & Johnson, Automotive Encyclopedia

d. Ellinger, Automotive Electrical Systems

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Auto Mechanics, Vol. I, II

TASK

AA-12 Testing and replacing instrument gauge and sending unit

PERFORMANCE OBJECTIVE

Test and replace instrument gauge and sending unit.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Printed circuits
b. Instrument gauges
c. Sending unit

Provide Demonstration On:

a. Instrument gauge removal
b. Sending unit location
c. Sending unit location
d. Removing sending unit

Provide Practical Application On:

a. Removing and testing printed circuits
b. Removing instrument gauge
c. Removing sending unit
d. Testing instrument gauge
e. Testing sending unit
f. Replacing instrument gauge
g. Replacing sending unit

Related Instructions:

Tasks: RI-01; RI-03; RI-05; RI-08

INSTRUCTIONAL MATERIALS

Textbooks:

Crouse (2)

Student Manuals:

Oklahoma, Auto Mechanics II

Tools and Equipment:

a. VOM
b. Shop Manual
c. Hand tools

CLASSROOM HOURS 6

EVALUATION (AA-12)

a. Given an automobile and necessary tools and equipment, the learner will troubleshoot all gauges and instruments on the vehicle and repair or replace as needed according to vehicle manufacturer's specifications.

b. Oklahoma, Auto Mechanics II

c. Crouse, The Auto Book & The Auto Study Guide

d. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Auto Mechanics, Vol. I, II

TASK

AA-13 Testing and repairing the cruise control unit

PERFORMANCE OBJECTIVE

Test and repair the cruise control unit.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Cruise control operation
b. Cruise control circuits

Provide Demonstration On:

a. Cruise control disassembly
b. Cruise control inspection
c. Cruise control repair

Provide Practical Application On:

a. Disessembling cruise control mechanism
b. Inspecting cruise control mechanicsm
c. Repairing cruise control mechanism

Related Instructions:

Tasks: RI-01; RI-03; RI-05; RI-08; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

Crouse (2)

Student Manuals:

Ford, "Speed Control Diagnosis" (3701-007)

Tools and Equipment:

a. Twinpost lift
b. VOM
c. Hand tools
d. Shop Manuals

CLASSROOM HOURS

6

EVALUATION (AA-13)

a. Given an automobile with a cruise control unit and necessary tools and equipment, the learner will test, identify and repair the cruise control in accordance with manufacturer's specifications.

b. V'TECS, Auto Mechanics; Task No. 105

TASK

AA-14 Testing and repairing the automatic alarm system

PERFORMANCE OBJECTIVE

Test and repair the automatic alarm system.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Automatic alarm triggering devices
b. Automatic alarm wiring circuits
c. Automatic alarm bypass interlocks

Provide Demonstration On:

a. Automatic alarm circuits
b. Automatic alarm component locations
c. Bypassing automatic alarms

Provide Practical Application On:

a. Testing automatic alarm circuits
b. Locating components of the automatic alarm system
c. Bypassing automatic alarms for testing procedures

Related Instructions:

Tasks: RI-01; RI-03; RI-0[illegible] RI-08; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

Crouse (2)

Student Manuals:

a. Ellinger, *Automotive Electrical Systems*
b. Oklahoma, *Auto Mechanics II*

Tools and Equipment:

a. Hand tools
b. VOM
c. Test light
d. Shop Manual

CLASSROOM HOURS

4

EVALUATION (AA-14)

a. Given an automobile with an automatic alarm system and necessary tools and equipment, the learner will test and repair the alarm system according to manufacturer's specifications.

b. Oklahoma, Auto Mechanics II

c. Ellinger, Automotive Electrical Systems

d. V'TECS, Automotive Mechanics; Task No. 83

TASK

AA-15 Testing and repairing the CB radio power circuit

PERFORMANCE OBJECTIVE

Test and repair the CB radio power circuit.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Transmitting devices
b. Radio frequency testing devices
c. CB radio operation
d. CB radio electrical supply circuits

Provide Demonstration On:

a. Testing CB radio supply circuits
b. Testing radio frequency
c. Testing CB antenna

Provide Practical Application On:

a. Testing CB radio electrical supply circuit
b. Testing frequency
c. Testing CB antenna for transmitting efficiency

Related Instructions:

Tasks: RI-01; RI-03; RI-05 RI-08

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse (2)
b. Shultz

Tools and Equipment:

a. VOM
b. Frequency/layout meter
c. Hand tools
d. Operators Handbook

CLASSROOM HOURS 6

EVALUATION (AA-15)

Given an automobile with a CB radio and necessary tools and equipment, the learner will test and repair the components of the CB radio power supply circuit according to manufacturer's specifications.

TASK

AA-16 Testing and trimming the CB radio antenna

PERFORMANCE OBJECTIVE

Test and trim the radio antenna.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Wave frequency
b. Band operation

Provide Demonstration On:

a. Testing antenna height for reception
b. Trimming antenna

Provide Practical Application On:

a. Test antenna for most efficient reception
b. Trim antenna for most efficient reception

Related Instructions:

Tasks: RI-01; RI-03; RI-05

INSTRUCTIONAL MATERIALS

Textbooks:

Schultz

Tools and Equipment:

a. Reception meters
b. Screwdriver
c. Manual

CLASSROOM HOURS 4

EVALUATION (AA-16)

Given an automobile with CB AM/FM radio and necessary tools and equipment, the learner will test and trim the antenna to the most efficient radio operation and according to manufacturer's specifications.

TASK

AA-17 Testing and repairing power windows and seats

PERFORMANCE OBJECTIVE

Test and repair power windows and seat.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Power window circuits and operation
b. Power seat circuits and operation
c. Power window controls
d. Power seat controls

Provide Demonstration On:

a. Power window drive motor inspection
b. Power seat drive motor inspection
c. Circuit testing

Provide Practical Application On:

a. Removing and inspecting window drive motor and controls
b. Removing and inspecting seat drive motor and control

Related Instructions:

Tasks: RI-01; RI-03; RI-05; RI-08; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Toboldt & Johnson
b. Crouse (2)

A/VS:

Georgia Auto Mechanics Program (Slide set 243-3)

Student Manuals:

a. Georgia Auto Mechanics Program (243-3)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. VOM
b. Test light
c. Hand tools
d. Shop Manual

CLASSROOM HOURS

6

EVALUATION (AA-17)

a. Given a automobile with power seats and windows and necessary tools and equipment, the learner will troubleshoot the power window and power seat system and repair or replace controls and drive motors according to manufacturer's specifications.

b. Oklahoma, Auto Mechanics II

c. Toboldt & Johnson, Automotive Encyclopedia

TASK

AA-18 Testing and repairing fog lights

PERFORMANCE OBJECTIVE

Test and repair fog lights and circuit.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Fog light operation
b. Candle power rating
c. Sealed beam qualities
d. Fog light circuits

Provide Demonstration On:

a. Fog light bulb inspection and testing
b. Testing fog light circuits
c. Aiming fog lights

Provide Practical Application On:

a. Inspect fog light bulbs
b. Test fog light circuits
c. Aim fog lights
d. Install fog light kit

Related Instructions:

Tasks: RI-01; RI-03; RI-05; RI-08; RI-10

INSTRUCTIONAL MATERIALS

Textbooks:

Crouse (2)

Tools and Equipment:

a. VOM
b. Hand tools
c. Shop Manual

CLASSROOM HOURS 6

EVALUATION (AA-18)

Given an automobile with fog lights and necessary tools and equipment the learner will test and repair the fog lights according to manufacturer's specifications. The learner will also install and aim fog lights for most efficient operation and safety.

TASK

AA-19 Testing system air conditioning performance

PERFORMANCE OBJECTIVE

Visually inspect system, connect a manifold gauge set and performance test system, analyze test results and recommend needed service.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Visual inspection
   1. Belts
   2. Bracketts
   3. Lines
   4. Condensor
   5. Compressor oil and clutch
   6. Ducts
   7. Evaporator
   8. Blower motor operation
   9. Any signs of leaking
   10. System air filters
   11. Sight glass for bubbles
b. Gauge connections (high and low side)
c. Pressure readings compared to ambient temperature

Provide Demonstration On:

a. Visual inspection
b. Gauge connections
c. Gauge reading

Provide Practical Application On:

a. Developing and using a check list for a visual inspection
b. Connecting gauges and measuring pressures and making temperature comparisons

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-11; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

Dwiggens (1)

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 243-8A,B, C; 263-1)
b. Ford, "Air Conditioning - How it Works" (Filmstrip 3630-101) and "Air Conditioning Principles (Transparency 3630-104)

Student Manuals:

a. Georgia Auto Mechanics Program (243-8; 263-1)
b. Ford, Air Conditioning - How it Works (3630-101)
c. Oklahoma, Auto Mechanics, Vol. II
d. Notgrass, Automotive Air Conditioning Mechanic

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CLASSROOM HOURS 6

EVALUATION (AA-19)

a. Given an automobile with air conditioner and necessary tools and equipment, the learner will visually inspect the air conditioning system, performance test system and record results. All defects must be noted and recordings must be within 10% of instructor's.

b. Oklahoma, Automotive Mechanics II

c. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

d. V'TECS, Automotive Mechanics; Task No. 208

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INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Automobile
b. Hand tools
c. Gauge set
d. Service manual

TASK

AA-20 Discharging the system

PERFORMANCE OBJECTIVE

Discharge and purge the system.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Safety precautions
b. Gauge connections
c. Stabilizing system
d. Procedures
    1. Connect gauges
    2. Adjust controls to maximum cool and operate for 15 minutes
    3. Engine speed to idle
    4. Open low side slightly with discharge hose in container
    5. Open high side slowly
    6. Close when refrigerant ceases to flow
    7. Both gauges should read "0

Provide Demonstration On:

Discharging the system

Provide Practical Application On:

Discharging the system

Related Instruction:

Tasks: RI-01; RI-03; RI-05;
RI-11; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

Dwiggens (1)

A/Vs:

a. Georgia Auto Mechanics Program, (Slide set 263-1)
b. Ford, "Air Conditioning Systems" (Slide set 3631-103)

Student Manuals:

a. Georgia Auto Mechanics Program (263-1)
b. Ford, Air Conditioning Systems (3631-103)
c. Oklahoma, Auto Mechanics II
d. Notgrass, Automotive Air Conditioning Mechanic

Tools and Equipment:

a. Hand tools
b. Refrigeration wrenches
c. Gauges

CLASSROOM HOURS 2

EVALUATION (AA-20)

a. Given an automobile with air conditioner and necessary tools and equipment, the learner will discharge the system. Upon completion there must be no refrigerant left in the system.

b. Oklahoma, Automotive Mechanics II

c. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

d. V'TECS, Automotive Mechanics, Task No. 205

TASK

AA-21 Evacuating and charging the system

PERFORMANCE OBJECTIVE

Remove all moisture from system through evacuation and recharge system.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Safety precautions
b. Reasons for evacuation
c. Gauge connections
d. Procedures (engine off)
    1. Connect gauges
    2. Install center hose
    3. Open high and low side service valves (if used)
    4. Open high and low side manifold gauge valves
    5. Operate pump for 30 minutes
    6. Observe gauge for vacuum
    7. Close gauge valves
    8. Shut off pump
    9. Observe gauge for signs of leak (system should hold vacuum)
e. Low side charging
f. High side charging

Provide Demonstration On:

Evacuating and charging system

Provide Practical Application On:

Evacuate and charge system

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-11; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

Dwiggins (1)

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 243-10)
b. Prentice-Hall, "Automobile Air Conditioners" (Filmstrip #5)

Student Manuals:

a. Georgia Auto Mechanics Program (243-10)
b. Oklahoma, Auto Mechanics II
c. Notgrass, Automotive Air Conditioning Mechanic

Tools and Equipment:

a. Automobile
b. Refrigeration tools
c. Gauges
d. Refrigerant
e. Pump and charging station
f. Shop manual

CLASSROOM HOURS

4

EVALUATION (AA-21)

a. Given an automobile with air conditioner and necessary tools and equipment, the learner will evacuate and recharge the system. Manufacturer's specifications must be met.

b. Oklahoma, Automotive Mechanics II

c. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

d. V'TECS, Automotive Mechanics; Task No. 205, 206

TASK

AA-22 Rebuilding compressors

PERFORMANCE OBJECTIVE

Perform a compressor overhaul on piston and swash-plate type compressor.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Compressor types and design
b. Seals
c. Internal parts
d. Special tools

Provide Demonstration On:

a. Disassembling and inspecting compressor
b. Reassembling with new plate

Provide Practical Application On:

Rebuilding both types of compressors

Related Instruction:

Tasks: RI-01-03; RI-05-06;
RI-10-11; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

Dwiggins (1)

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 243-11A, 243-11B, 263-3, 263-4A, 263-4B)
b. Prentice-Hall, "Automobile Air Conditioners" (Filmstrip #1-4)

Student Manuals:

a. Georgia Auto Mechanics Program (243-11, 263-3, 263-4)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Special tools
b. Hand tools
c. Different types of compressors
d. Service manual

CLASSROOM HOURS

10

EVALUATION (AA-22)

a. Given an automobile air conditioner compressor and necessary tools and equipment, the learner will overhaul the unit. All work must be within manufacturer's specifications.

b. Oklahoma, Automotive Mechanics II

c. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

d. V'TECS, Automotive Mechanics; Task No. 210, 214, 216

TASK

AA-23 Replacing refrigerant lines and accessories

PERFORMANCE OBJECTIVE

Replace lines, sight glass, receiver-drier, expansion valve and POA valve.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Each component and its function
b. High and low pressure hoses and lines
c. Safety
d. Methods of replacement

Provide Demonstration On:

Replacing components

Provide Practical Application On:

Replace lines and components

Related Instruction:

Tasks: RI-01-01; RI-05; RI-11; TI-13; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

Dwiggins (1)

A/Vs:

Georgia Auto Mechanics Program (slide set 243-12A; 263-5)

Student Manuals:

a. Georgia Auto Mechanics Program (243-12; 263-5, 263-6, 263-7)
b. Notgrass, Automotive Air Conditioning Mechanic

Tools and Equipment:

a. Refrigeration tools
b. Various accessories
c. Lines and tubing
d. Service manual

CLASSROOM HOURS	10

EVALUATION (AA-23)

a. Given an automobile with air conditioner and necessary tools and equipment, the learner will replace a flexible or metal line, a receiver-drier, expansion valve, sight glass and POA valve. The system must operate within the manufacturer's specifications when charged.

b. Oklahoma, Automotive Mechanics II

c. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

d. V'TECS, Automotive Mechanics; Task No. 219, 220, 221

TASK

AA-24 Installing air conditioning units

PERFORMANCE OBJECTIVE

Install and operate an "add-on" air conditioning unit.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Review of components
b. Interpreting manufacturer's instructions
c. Safety
d. Testing unit

Provide Demonstration On:

Reading and interpreting manufacturer's instructions

Provide Practical Application On:

Installing an add-on unit in a live vehicle or mock-up lab engine

Related Instruction:

Tasks: RI-01; RI-03; RI-05;
RI-11; RI-13

INSTRUCTIONAL MATERIALS

Student Manuals:

Georgia Auto Mechanics Program (243-13)

Tools and Equipment:

a. Hand and refrigeration tools
b. Add-on kit
c. Gauges
d. Manufacturer's installation instructions

CLASSROOM HOURS

30

EVALUATION (AA-24)

a. Given a vehicle (live or mock-up) and necessary tools and equipment, the learner will install the air conditioner unit and operate. The unit must perform to manufacturer's specifications. All related work must be according to installation instructions and without damage to vehicle.

b. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

c. V'TECS, Automotive Mechanics; Task No. 207, 215, 217, 218, 222

TASK

AA-25 Diagnosing air conditioning problems

PERFORMANCE OBJECTIVE

Develop a troubleshooting plan to locate problems in the air conditioning system.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Troubleshooting procedures
b. Using sight, touch and smell
c. Using the gauges and a thermometer
d. Testing for leaks

Provide Demonstration On:

a. Locating problems using a troubleshooting chart
b. Using a leak tester

Provide Practical Application On:

Have learner develop and use a troubleshooting plan on a unit with a known malfunction.

Related Instruction:

Tasks: RI-01; RI-03-05; RI-11; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

Dwiggins (1)

A/Vs:

Prentice-Hall, "Automobile Air Conditioners" (filmstrip #5)

Student Manuals:

a. Oklahoma, Auto Mechanics II
b. Notgrass, Automotive Air Conditioning Mechanic

Tools and Equipment:

a. Gauges
b. Thermometer
c. Leak tester
d. Troubleshooting chart

CLASSROOM HOURS 6

EVALUATION (AA-25)

a. Given an automotive air conditioning system with a known problem and necessary tools and equipment, the learner will locate the problem and recommend repairs that are needed. Problems must be discovered by using a troubleshooting plan and recommendations must be within the manufacturer's specifications.

b. Oklahoma, Automotive Mechanics II

c. Georgia Student Assessment System, Domain Referenced Tests, Transportation/Automotive Mechanics, Vol. I, II

d. V'TECS, Automotive Mechanics; Task No. 204

TASK

PT-01 Adjusting and repairing clutch and shift linkage

PERFORMANCE OBJECTIVE

Adjust and repair clutch and shift linkage.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Clutch function
b. Clutch and flywheel assembly
c. Clutch linkage
d. Clutch disc construction
e. Pressure plate construction
f. Shift linkage function
g. Shift linkage types

Provide Demonstration On:

a. Adjusting clutch
b. Repairing clutch
c. Adjusting shift linkage
d. Repairing shift linkage

Provide Practical Application On:

a. Adjust and repair clutch
b. Adjust and repair shift linkage

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (6)
b. Crouse (1)

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 241-3)
b. Bergwall, "The Automotive Cluth Assembly Explained" (Filmstrip #1, 3, 4)
c. Ford "Car and Truck Clutches" (Transp. 1601-103)

Student Manuals:

Georgia Auto Mechanics Program (241-3)

Tools and Equipment:

a. Hand tools
b. Auto shop repair manual

CLASSROOM HOURS

10

EVALUATION (PT-01)

a. Given an operational automotive manual transmission system and necessary tools and equipment, the learner will adjust and repair clutch and shift linkage to operate within manufacturer's specifications.

b. Crouse & Anglin, Workbook.

c. Hughes, Guide to the Automobile Mechanic Certification Exam.

d. Bergwall, filmstrip questions.

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II.

f. V'TECS, Automotive Mechanics, Task No. 29, 30.

TASK

PT-02 Removing and disassembling transmission

PERFORMANCE OBJECTIVE

Remove and disassemble manual transmission.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Transmission function
b. 3 speed manual transmission
c. 4 speed manual transmission
d. 5 speed manual transmission
e. Transaxle assembly front or rear

Provide Demonstration On:

a. Removing and disassembling a 3, 4 or 5 speed transmission
b. Removing and disassembling a transaxle assembly

Provide Practical Application On:

a. Remove and disassemble a 3, 4, or 5 speed transmission
b. Remove and disassemble a transaxle assembly

Related Instructions:

Tasks: RI-01; RI-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (6)
b. Crouse (1)

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 241-2,4)
b. Bergwall, "The Automotive Standard Transmission Explained (Filmstrip #1,2,5)
c. Ford, "Manual Shift 3 Speed Overdrive Transmissions" (Transp. 1611-104) and "Manual Shift 3 and 4 Speed Transmissions" (Transp. 1611-204)

Student Manuals:

a. Georgia Auto Mechanics Program (241-2; 241-4)
b. Oklahoma, Auto Mechanics II
c. Ford, Five Speed Manual Overdrive Transmission (1641-001)

Tools and Equipment:

a. Hand tools
b. Auto shop repair manual

CLASSROOM HOURS 15

EVALUATION (PT-02)

a. Given an operational automotive manual transmission system and necessary tools and equipment, the learner will remove the transmission and disassemble it according to standards of auto shop repair manual.

b. Crouse & Anglin, Workbook.

c. Hughes, Guide to the Automotive Mechanics Certification Exam.

d. Bergwall, Filmstrip questions.

e. Oklahoma, Automotive Mechanics II.

f. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II.

g. V'TECS, Automotive Mechanics, Task No. 37, 50.

TASK

PT-03 Inspecting and reassembling transmission

PERFORMANCE OBJECTIVE

Inspect and reassemble the manual transmission.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. 3 speed transmission inspection
b. 4 speed transmission inspection
c. 5 speed transmission inspection
d. Transaxle assembly inspection

Provide Demonstration On:

a. Inspecting and reassembling a 3, 4, or 5 speed transmission
b. Inspecting and reassembling a transaxle assembly

Provide Practical Application On:

a. Inspect and reassemble a 3, 4, or 5 speed transmission
b. Inspect and reassemble a transaxle assembly

Related Instructions:

Tasks: RI-01-03; RI-05-06; RI-11; RI-14-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (6)
b. Crouse (1)

A/Vs:

a. Georgia Auto Mechanics Program (Slide sets 241-2, 4)
b. Bergwall, "The Automotive Standard Transmission Explained" (Filmstrips #3, 4, 6)
c. Prentice-Hall, "Servicing the Standard Transmission" (Filmstrip)

Student Manuals:

a. Georgia Auto Mechanics Program (241-2,4)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Hand tools
b. Micrometer
c. Dial indicator
d. Auto shop repair manual
e. Feeler gauge

CLASSROOM HOURS 15

EVALUATION (PT-03)

a. Given a disassembled automotive manual transmission and necessary tools and equipment, the learner will inspect and reassemble the transmission according to manufacturer's specifications.

b. Crouse & Anglin, Workbook

c. Hughes, Guide to the Automotive Mechanics Certification Exam

d. Bergwall, filmstrip questions

e. Oklahoma, Automotive Mechanics II

f. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

g. V'TECS, Automotive Mechanics, Task No. 38, 46, 47, 66

TASK

PT-04 Removing and replacing clutch assembly

PERFORMANCE OBJECTIVE

Remove and replace the clutch assembly.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Clutch function
b. Power flow
c. Disassembly of clutch
d. Assembly of clutch
e. Aligning clutch disc
f. Identifying front and rear of clutch disc

Provide Demonstration On:

a. Removing clutch assembly
b. Replacing clutch assembly

Provide Practical Application On:

Removing and replacing clutch assembly

Related Instruction:

Tasks: RI-01-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (6)
b. Crouse (1)

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 241-3)
b. Bergwall "The Automotive Clutch Assembly Explained" (Filmstrip #1-6)
c. Prentice-Hall, "Servicing the Standard Clutch" (Filmstrip)

Student Manuals:

a. Georgia Auto Mechanics Program (241-3)
b. Oklahoma, Auto Mechanics II
c. Ford, Diagnosis of Clutch (1601-202)

Tools and Equipment:

a. Hand tools
b. Dial indicator set
c. Clutch aligning tool
d. Auto shop repair manual

CLASSROOM HOURS 10

EVALUATION (PT-04)

a. Given an operational automotive manual transmission system and necessary tools and equipment, the learner will remove and replace the clutch assembly according to standards of auto shop repair manual.

b. Crouse & Anglin, Workbook

c. Hughes, Guide to Automotive Mechanics Certification Exam.

d. Bergwall, filmstrip questions

e. Oklahoma, Automotive Mechanics II

f. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

g. V'TECS, Automotive Mechanics, Task No. 39, 45, 49, 52

TASK

PT-05 Removing and replacing the flywheel ring gear

PERFORMANCE OBJECTIVE

Remove and replace the flywheel ring gear.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Function of flywheel
b. Function of flywheel
c. Methods of removing ring gear
d. Methods of expanding ring gear to fit flywheel

Provide Demonstrations On:

a. Removing flywheel ring gear
b. Replacing flywheel ring gear

Provide Practical Applications On:

Removing and replacing flywheel ring gear

Related Instructions:

Tasks: RI-01-03; RI-05; RI-11; RI-13

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Hand tools
b. Acetylene torch
c. AC welder

CLASSROOM HOURS 10

EVALUATION (PT-05)

a. Given an automobile with standard transmission and necessary tools and equipment, the learner will remove and replace the flywheel ring gear according to manufacturer's specifications.

b. Hughes, Guide to Automotive Mechanics Certification Exam.

c. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

d. V'TECS, Automotive Mechanics, Task No. 21.

TASK

PT-06 Diagnosing manual transmission problems

PERFORMANCE OBJECTIVE

Develop a troubleshooting plan to locate problems in the manual transmission.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Manual transmission function
b. Manual transmission construction
c. Identifying problems by sound

Provide Demonstration On:

Diagnosing manual transmission problems

Provide Practical Application On:

Have learner identify a problem and describe the cause for a known standard transmission malfunction on a live vehicle

Related Instruction:

Tasks: RI-01; RI-03-05; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (6)
b. Crouse (1)

A/Vs:

a. Georgia Auto Mechanics Program (Slide sets 241-2, 3, 4)
b. Bergwall, "The Automotive Standard Transmission Explained" (Filmstrips #1-7)

Student Manuals:

a. Georgia Auto Mechanics Program (241-2, 3, 4)
b. Ford, Diagnosis of Manual Transmissions (1610-201)

Tools and Equipment:

a. Hand tools
b. Dial indicator
c. Micrometer
d. Clutch aligning tool
e. Auto repair manual

CLASSROOM HOURS 10

EVALUATION (PT-06)

a. Given an operational automobile with a defective manual transmission and necessary tools and equipment, the learner will formulate a troubleshooting plan and locate the problem in double the flat rate time.

b. Crouse & Anglin, Workbook

c. Hughes, Guide to Automotive Mechanics Certification Exam.

d. Bergwall, filmstrip questions

e. Oklahoma, Automotive Mechanics II

f. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

g. V'TECS, Automotive Mechanics, Task No. 54.

TASK

PT-07 Inspecting drive shaft

PERFORMANCE OBJECTIVE

Inspect drive shaft for warpage or wear.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Drive shaft operation
b. Drive shaft components
c. Universal joints
d. Two and three piece drive shafts

Provide Demonstration On:

a. Drive shaft removal
b. Drive shaft inspection
c. Balancing drive shaft

Provide Practical Application On:

a. Removing drive shaft from vehicle
b. Inspecting drive shaft

Related Instructions:

Tasks: RI-01; RI-03; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (6)
b. Toboldt & Johnson

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 241-1)
b. Prentice Hall, "Servicing the Drive Shaft and Universal Joints" (Filmstrip #1)
c. Bergwall, "Drive Shaft and Universal Joints Explained" (Filmstrip)

Student Manuals:

a. Georgia Auto Mechanics Program (241-1)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Grease dispenser
b. Hand tools
c. Twin post lift
d. Shop Manual
e. Drive Shaft

CLASSROOM HOURS

4

EVALUATION (PT-07)

a. Given an automobile and necessary tools and equipment the learner will inspect the drive shaft for wear or out of balance and make recommendations for repair. Recommendations must conform with manufacturer's specifications.

b. Oklahoma, Auto Mechanics II

c. Crouse, The Auto Book & The Auto Study Guide

d. Toboldt & Johnson, Automotive Encyclopedia

e. V'TECS, Automotive Mechanics; Task No. 33

f. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

TASK

PT-08 Removing and replacing universal joints

PERFORMANCE OBJECTIVE

Remove and replace universal joints.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Universal joint location
b. Universal joint inspection

Provide Demonstration On:

a. Universal joint removal
b. Universal joint inspection
c. Replacing universal joint

Provide Practical Application On:

a. Removing universal joint
b. Inspecting universal joint
c. Replacing universal joint

Related Instructions:

Tasks: RI-01-03; RI-05; RI-10-11; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (6)
b. Toboldt & Johnson

A/Vs:

a. Georgia Auto Mechanics Program (Slide set 241-1)
b. Prentice Hall, "Servicing the Drive Shaft and Universal Joints" (Filmstrip #2)

Student Manuals:

a. Georgia Auto Mechanics Program (241-1)
b. Oklahoma; Auto Mechanics II

Tools and Equipment:

a. Hand tools
b. Press
c. Grease dispenser
d. Shop Manual
e. Drive shaft & u-joints

CLASSROOM HOURS 3

EVALUATION (PT-08)

a. Given an automobile with defective universal joint(s) and necessary tools and equipment the learner will inspect, remove and replace the joint according to manufacturer's specifications. The installed joint must turn freely without binding.

b. Crouse, The Auto Book & The Auto Study Guide

c. Toboldt & Johnson, Automotive Encyclopedia

d. Oklahoma, Automotive Mechanics II

e. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

TASK

PT-09 Removing and repairing constant velocity joints

PERFORMANCE OBJECTIVE

Remove and repair a constant velocity joint.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Constant velocity joint application
b. Constant velocity joint operation
c. The need for constant velocity joints

Provide Demonstration On:

a. Constant velocity joint location
b. Constant velocity joint removal
c. Constant velocity joint inspection
d. Constant velocity joint repair

Provide Practical Application On:

a. Locating constant velocity joint
b. Removing constant velocity joint
c. Inspecting constant velocity joint
d. Repairing constant velocity joint

Related Instructions:

Tasks: RI-01-03; RI-05; RI-10-11; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (6)
b. Toboldt & Johnson

Student Manuals:

Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Hand tools
b. Shop Manuals

CLASSROOM HOURS 6

EVALUATION (PT-09)

a. Given an automobile with a defective constant velocity joint and necessary tools and equipment the learner will inspect, remove and repair constant velocity joints according to manufacturer's specifications.

b. Toboldt & Johnson, Automotive Encyclopedia

c. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

d. Oklahoma, Auto Mechanics II

TASK

PT-10 Removing and replacing rear axle bearings

PERFORMANCE OBJECTIVE

Remove and replace rear axle bearings.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Axle bearing construction
b. Types of axle bearings
c. Axle bearing operation
d. Axle bearing splitter device
e. Safety while removing & pressing bearing on shaft

Provide Demonstration On:

a. Hydraulic press operation
b. Axle bearing removal
c. Axle bearing replacement
d. Proper safety procedures

Provide Practical Application On:

a. Removing axle bearing with splitter and puller
b. Inspecting axle
c. Pressing bearing on axle with hydraulic press
d. Replacing axle

Related Instructions:

Tasks: RI-01-03; RI-05; RI-10-11; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

Crouse & Anglin (6)

A/Vs:

Georgia Auto Mechanics Program (Slide set 241-7)

Student Manuals:

a. Georgia Auto Mechanics Program (241-7)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Hydraulic press
b. Axle bearing splitter & puller
c. Shop Manual
d. Axle shaft

CLASSROOM HOURS 5

EVALUATION (PT-10)

a. Given an automobile with a defective axle bearing and necessary tools and equipment the learner will remove and replace the rear axle bearing using procedures recommended in the repair manual. The bearing must seat properly and rotate freely.

b. Oklahoma, Auto Mechanics II

c. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

d. V'TECS, Automotive Mechanics; Task No. 50

TASK

PT-11 Removing and disassembling differential assembly

PERFORMANCE OBJECTIVE

Remove driveline and axles, and remove and disassembly differential assembly.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Differential function
b. Differential types
c. Differential construction
d. Parts which must be removed to gain access
e. Ring gear and pinion, planetary gears, axle gears and all bearings

Provide Demonstration On:

a. Removing differential assembly
b. Disassembling differential assembly

Provide Practical Application On:

Remove and disassemble differential assembly

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-10; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (6)
b Crouse (1)

A/Vs;

a. Georgia Auto Mechanics Program (Slide set 241-5-A) Filmstrip #241-5-B, 5-C, 241-6-B, 6-C)
b. Bergwall, "The Automotive Differential Explained" (Filmstrips #1,2)
c. Ford, "Rear Axle and Drive Shaft" (Filmstrip 1501-101)

Student Manuals:

a. Georgia Auto Mechanics Program (241-5, 6)
b. Oklahoma, *Auto Mechanics II*
c. Ford, *Rear Axle and Drive Shaft* (1501-101)

Tools and Equipment:

a. Hand tools
b. Dial indicator set
c. Assorted bearing pullers
d. Hydraulic press
e. Auto shop repair manual

CLASSROOM HOURS

25

EVALUATION (PT-11)

a. Given an operational automotive differential assembly and necessary tools and equipment, the learner will remove and disassemble the differential according to manufacturer's specifications.

b. Crouse & Anglin, Workbook

c. Hughes, Guide to the Automobile Mechanics Certification Exam.

d. Bergwall, filmstrip questions

e. Oklahoma, Automotive Mechanics II

f. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

g. V'TECS, Automotive Mechanics, Task No. 40.

TASK

PT-12 Inspecting and reassembling differential assembly

PERFORMANCE OBJECTIVE

Inspect and assemble differential assembly.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Differential function
b. Differential types
c. Differential construction
d. Differential setup and adjustment

Provide Demonstration On:

a. Inspecting differential assembly
b. Assembling differential assembly

Provide Practical Application On:

Inspecting, assembling, and adjusting differential

Related Instruction:

Tasks: RI-01-03; RI-05-06; RI-10; RI-14-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (6)
b. Crouse (1)

A/Vs:

a. Georgia Auto Mechanics (Slide set 241-5-A); (Filmstrip #241-5-B-5-C, 241-6-B-6-C)
b. Bergwall, "The Automotive Differential Explained" (Filmstrip #3 and "The Limited Slip Differential Explained" (Filmstrip)
c. Ford, "Rear Axle Diagnosis and Repair" (Filmstrip 1501-201)

Student Manuals:

a. Georgia Auto Mechanics Program (241-5-6)
b. Oklahoma, Auto Mechanics II
c. Ford, Rear Axle Diagnosis and Repairs (1501-201)

Tools and Equipment:

a. Hand tools
b. Dial indicator
c. Assorted bearing pullers
d. Hydraulic press
e. Gear tooth marking compound
f. Auto shop repair manual

CLASSROOM HOURS

25

EVALUATION (PT-12)

a. Given a disassembled automotive differential assembly and necessary tools and equipment, the learner will inspect and assemble the differential according to manufacturer's specifications.

b. Crouse & Anglin, Workbook

c. Hughes, Guide to the Automobile Mechanics Certification Exam.

d. Bergwall, filmstrip questions

e. Oklahoma, Automotive Mechanics II

f. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

g. V'TECS, Automotive Mechanics, Task No. 40, 41

TASK

PT-13 Removing and replacing front drive axle assembly

PERFORMANCE OBJECTIVE

Remove and replace front drive axle assembly.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Front drive axle function
b. Front drive axle types
c. Front drive axle construction

Provide Demonstration On:

a. Removing front drive axle assembly
b. Replace front drive axle assembly

Provide Practical Application On:

Removing and replacing front drive axle assembly

Related Instruction:

Tasks: RI-01-03; RI-04-05; RI-09; RI-14-15

INSTRUCTIONAL MATERIALS

Textbooks:

Crouse & Anglin (6)

Tools and Equipment:

a. Hand tools
b Special tools called for by manufacturer's manual
c. Auto shop repair manual

CLASSROOM HOURS 30

EVALUATION (PT-13)

a. Given an operational automotive front drive axle assembly and necessary tools and equipment, the learner will remove and replace the front axle drive assembly according to manufacturer's specifications.

b. Crouse & Anglin, Workbook

c. Hughes, Guide to the Automotive Mechanics Certification Exam.

d. V'TECS, Automotive Mechanics, Task No. 43, 44

TASK

PT-14 Rebuilding four-wheel-drive locking hubs

PERFORMANCE OBJECTIVE

Rebuild four-wheel-drive locking hubs.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Locking hub operation
b. Types of locking hubs
c. Locking hub construction
d. Planet and carrier type differentials

Provide Demonstration On:

a. Locking hub removal
b. Locking hub inspection
c. Locking hub rebuilding

Provide Practical Application On:

a. Removing locking hubs
b. Disassembling locking hubs
c. Inspecting components of locking hub
d. Rebuilding locking hub

Related Instructions:

Tasks: RI-01-03; RI-05; RI-10-11; RI-15

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Hand tools
b. Shop Manual
c. Four-wheel-drive vehicle

CLASSROOM HOURS 10

EVALUATION (PT-14)

a. Given a four-wheel-drive vehicle with defective locking hub and necessary tools and equipment the learner will disassemble, inspect and rebuild the hub(s) according to manufacturer's specifications. Upon completion the hub must operate correctly without binding or noisy operation.

b. V'TECS, Automotive Mechanics; Task No. 43, 44

TASK

PT-15 Rebuilding the four wheel drive transfer case

PERFORMANCE OBJECTIVE

Rebuild the four wheel drive transfer case.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Four wheel drive transfer case function
b. Four wheel drive transfer case construction
c. Four wheel drive transfer case types

Provide Demonstration On:

a. Removing transfer case function
b. Four wheel drive transfer case construction
c. Four wheel drive transfer case types

Provide Practical Application On:

a. Remove transfer case
b. Inspect transfer case
c. Rebuild transfer case
d. Install transfer case

Related Instruction:

Tasks: RI-01-03; RI-05-06; RI-11; RI-14-15

INSTRUCTIONAL MATERIALS

Tools and Equipment:

a. Hand tools
b. Special tools called for by manufacturer's manual
c. Auto shop repair manual

CLASSROOM HOURS 25

EVALUATION (PT-15)

Given an operational automotive four wheel drive transfer case and necessary tools and equipment, the learner will rebuild the transfer case according to manufacturer's specifications.

TASK

PT-16 Diagnosing drive line and rear end problems

PERFORMANCE OBJECTIVE

Develop a troubleshooting plan for locating problems in the drive line and rear end.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Drive line function
b. Drive line construction
c. Rear end function
d. Rear end construction
e. Interpreting noises

Provide Demonstration On:

a. Diagnosing drive line problems by sight
b. Diagnosing rear end problems by sound

Provide Practical Applications On:

Developing a plan and locating a known problem in the drive line and rear end

Related Instruction:

Tasks: RI-01; RI-03-05; RI-09; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (6)
b. Crouse (1)

A/Vs:

a. Georgia Auto Mechanics (Slide sets 241-1-7)
b. Bergwall, "The Automotive Differential Explained" (Filmstrips 1-3) and "Drive Shaft and Universal Joints Explained" (Filmstrips #1, 2)

Student Manuals:

a. Georgia Auto Mechanics Program (241-1-2)
b. Oklahoma, *Auto Mechanics II*

Tools and Equipment:

a. Hand tools
b. Dial indicator set
c. Auto repair manual
d. Troubleshooting chart

CLASSROOM HOURS

10

EVALUATION (PT-16)

a. Given a malfunctioning automotive drive line and rear end and necessary tools and equipment, the learner will formulate a troubleshooting plan and locate the problem in double the flat rate time.

b. Crouse & Anglin, Workbook

c. Hughes, Guide to the Automotive Mechanics Certification Exam.

d. Bergwall, filmstrip questions

e. Oklahoma, Automotive Mechanics II

f. Georgia Student Assessment System, Domain Referenced Tests; Transportation/Automotive Mechanics, Vol. I, II

g. V'TECS, Automotive Mechanics, Task No. 32

TASK

PT-17 Testing the automatic transmission

PERFORMANCE OBJECTIVE

Perform operational and pressure tests to determine internal condition of transmission.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Principles of operation
b. Component identification
c. Operational checks
d. Using the pressure gauge
e. Fluid condition test
f. Safety

Provide Demonstration On:

Testing the automatic transmission using pressure tests and the senses of smell, touch and sight

Provide Practical Application On:

Have the learner perform an in-the-car transmission test and record information

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (6)
b. Crouse (1)

A/Vs:

a. Delmar, "Hydraulic Control" (Filmstrip #1)
b. Ford, "Transmission Models C-3, C-4, C-6, JATCO, FMX and Auto Overdrive" (Transp. and student texts)
c. Bergwall, "The Automatic Transmission Explained" (Filmstrips #1, 2)
d. Prentice-Hall, "Automatic Transmission Maintenance" (Filmstrip)

Student Manuals:

a. Ford, (All transmission models)
b. Oklahoma, Auto Mechanics II

CLASSROOM HOURS 7

EVALUATION (PT-17)

a. Given an automobile with automatic transmission and necessary tools and equipment, the learner will test the transmission and record information. All recordings must be with 10% of known data.

b. V'TECS, Automotive Mechanics, Task No. 67

c. Questions included in textbook

d. Oklahoma, Auto Mechanics II

INSTRUCTIONAL MATERIALS:

Tools and Equipment:

a. Hand tools
b. Service manual and specifications
c. Pressure gauge
d. Vacuum gauge and pump
e. Tachometer

TASK

PT-18 Inspecting and adjusting shift linkage

PERFORMANCE OBJECTIVE

Perform an automatic transmission linkage inspection and adjustment.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Linkage diagram
b. Purpose of linkage movements
c. Description of defective linkage
d. Linkage specifications

Provide Demonstration On:

Inspect and adjust automatic transmission linkage with the use of sight and manipulation of tools and equipment

Provide Practical Application On:

Inspecting, evaluating, and adjusting the automatic transmission linkage

Related Instruction:

Tasks: RI-01; RI-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (6)
b. Crouse (1)

A/Vs:

Georgia Auto Mechanics Program (Slide set 242-2)

Student Manuals:

a. Georgia Auto Mechanics Program (242-2)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Hand tools and equipment
b. Servica manual and specifications

CLASSROOM HOURS 2

EVALUATION (PT-18)

a. Given an automobile equipped with adjustable shifter linkage and necessary service manuals and tools and equipment, student will make adjustments to manufacturer's recommended procedures and specifications.

b. Crouse & Anglin, Workbook

c. Hughes, Guide to the Automobile Mechanics Certification Exam

d. Oklahoma, Auto Mechanics II

e. V'TECS, Automotive Mechanics, Task No. 55, 56, 57

TASK

PT-19 Removing and replacing automatic transmission oil filter

PERFORMANCE OBJECTIVE

Remove and replace the transmission oil filter.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Transmission oil filter construction
b. Transmission oil filter types
c. Transmission oil filter operation
d. When and why replace the filters
d. Transmission oil filter cleaning
e. Transmission oil filter replacing

Provide Demonstration On:

a. Transmission oil filter location
b. Transmission oil filter removal
c. Transmission oil filter inspection

Provide Practical Application On:

a. Locating transmission oil filter
b. Removing transmission oil filter
c. Inspecting transmission oil filter
d. Cleaning transmission oil filter
e. Replacing transmission oil filter

continued on back

INSTRUCTIONAL MATERIALS

Textbooks:

Crouse & Anglin (6)

A/Vs:

a. Prentice-Hall "Automatic Transmission Maintenance" (Filmstrip #1)

b. Georgia Auto Mechanics Program (Slide set 242-3)

Student Manuals:

a. Georgia Auto Mechanics Program (242-3)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Hand tools
b. Cleaning vat
c. Shop Manual
d. Automatic transmission

CLASSROOM HOURS 6

EVALUATION (PT-19)

a. Given an automobile with an automatic transmission and necessary tools and equipment the learner will remove and replace the transmission oil filter according to manufacturer's specifications. Upon completion there must be no visible oil leaks.

b. V'TECS, Automotive Mechanics, Task No. 72

c. Oklahoma, Auto Mechanics II

d. Crouse & Anglin, Workbook

INSTRUCTIONAL ACTIVITIES

Related Instructions:

Tasks: RI-01-03; RI-05; RI-10-11

TASK

PT-20 Testing and adjusting the automatic transmission vacuum modulator

PERFORMANCE OBJECTIVE

Test and adjust the vacuum modulator.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Vacuum modulator location
b. Vacuum modulator operation
c. Vacuum systems
d. Modulator adjustment

Provide Demonstration On:

a. Locating modulator
b. Testing modulator
c. Testing vacuum supply system
d. Adjusting modulator

Provide Practical Application On:

a. Locating modulator
b. Testing modulator
c. Testing vacuum supply system
d. Adjusting modulator

Related Instructions:

Tasks: RI-01-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

Crouse & Anglin (6)

A/Vs:

Georgia Auto Mechanics Program (Slide set 242-2)

Student Manuals:

a. Georgia Auto Mechanics Program (242-2)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Twin post lift
b. Vacuum gauge
c. Hand tools
d. Shop manual
e. Vacuum modulator

CLASSROOM HOURS 6

EVALUATION (PT-20)

a. Given an automobile with automatic transmission and necessary tools and equipment, the learner will locate, test and adjust the vacuum modulator according to manufacturer's specifications.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Oklahoma, Auto Mechanics II

d. V'TECS, Automotive Mechanics, Task No. 56, 60

e. Crouse & Anglin, Workbook

TASK

PT-21 Removing and disassembling transmission

PERFORMANCE OBJECTIVE

Remove and disassemble transmission for internal parts inspection.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Tools and equipment usage
b. Transmission oil drain
c. Propeller shaft removal
d. Removal and disassembly information
e. Torque converter removal

Provide Practical Application On:

Have the learner perform removal and disassembly of the transmission

Provide Demonstration On:

Removing and disassembling the automatic transmission by using tools and equipment and proper hand and body manipulation

Related Instructions:

Tasks: RI-01; RI-03; RI-05; RI-11

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (6)
b. Crouse (1)

A/Vs:

a. Bergwall, "The Automatic Transmission Explained" (Filmstrip)
b. Prentice-Hall, "Servicing the Automatic Transmission" (Filmstrip #2, 3)
c. Ford, (complete series for Ford models)

Student Manuals:

a. Ford (student texts to cover all Ford models)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Hand tools
b. Lift
c. Transmission jack
d. Drain pan
e. Transmission work stand
f. Slide hammers
g. Clutch spring depresser
h. Shop manual

CLASSROOM HOURS

20

EVALUATION (PT-21)

a. Given a vehicle with an automatic transmission and necessary tools and equipment, the learner will abide by all safety rules and manufacturer's procedures to remove transmission and disassemble. Student will complete task within 1½ flat rate time.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Oklahoma, Auto Mechanics II

d. V'TECS, Automotive Mechanics, Task No. 58, 68

e. Bergwall, filmstrip questions

f. Crowe & Anglin, Workbook

TASK

PT-22 Inspecting and reassembling transmission

PERFORMANCE OBJECTIVE

Perform parts inspection to determine condition, and reassembly to restore normal operation.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Parts description and assembly order
b. Measuring device usage
c. Safety

Provide Demonstration On:

Inspection of parts by using measuring devices, and sight

Provide Practical Application On:

Have the learner perform component inspection and transmission reassembly

Related Instruction:

Tasks: RI-01-03; RI-05-06; RI-10-11; RI-14-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (6)
b. Crouse (1)

A/Vs:

a. Georgia Auto Mechanics Program (Filmstrip 271-1A, B; 271-2A,B; Slide set 271-1 E, F. G; 271-1A1, A2; 271-2C, D, E, F, G; 271-3C, D, E)
b. Ford (all models)
c. Prentice-Hall, "Servicing The Automatic Transmission" (Filmstrip #1,3,4,5,6,7)

Student Manuals:

a. Georgia Auto Mechanics Program (271-1; 271-2; 271-3; 271-4; 271-5)
b. Oklahoma, Auto Mechanics II
c. Ford, (all models)

Tools and Equipment:

a. Dial indicator
b. Foot and inch pound torque wrench
c. Hand tools
d. Shop manual

CLASSROOM HOURS

20

EVALUATION (PT-22)

a. Given an automatic transmission in need of inspection and reassembly, and access to the proper hand tools and equipment, the learner will perform an inspection to be sure that all parts are within manufacturer's specifications, and to reassemble according to manufacturer's specifications within two times flat rate time.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Oklahoma, Auto Mechanics II

d. V'TECS, Automotive Mechanics, Task No. 59,60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71

e. Crouse & Anglin, Workbook

TASK

PT-23 Testing transmission on bench

PERFORMANCE OBJECTIVE

Perform a transmission bench test to determine internal operation and condition

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Principles of operation
b. Component identification
c. Casing port hole routing
d. Component engagement chart

Provide Demonstration On:

Testing the automatic transmission using compressed air, measuring devices, and sight

Provide Practical Application On:

Have the learner perform bench test and record information

Related Instructions:

Tasks: RI-01; RI-03; RI-05; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (6)
b. Crouse (1)

A/Vs:

Prentice-Hall "Servicing the Automatic Transmission" (Filmstrip #1)

Student Manuals:

Oklahoma, *Auto Mechanics II*

Tools and Equipment:

a. Micrometer
b. Dial indicator
c. Snap ring pliers
d. Hand tools
e. Air nozzle with rubber end
f. Transmission work stand
g. Clutch spring depressor
h. Slide hammer

CLASSROOM HOURS

10

EVALUATION (PT-23)

a. Given an automatic transmission and necessary tools and equipment, the learner will bench test the transmission and record information. All recordings must be within 10% of known data.

b. Hughes, Guide to the Automobile Mechanics Certification Exam

c. Oklahoma, Auto Mechanics II

d. Course & Anglin, Workbook

TASK

PT-24 Removing and replacing torque converter

PERFORMANCE OBJECTIVE

Remove, inspect and replace torque converter to restore proper operation.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Transmission removal
b. Torque converter removal and inspection
c. Seal replacing
d. Torque converter installation
e. Transmission installation

Provide Demonstration On:

Removing and replacing torque converter and seal

Provide Practical Application On:

Removing and replacing torque converter and front seal

Related Instructions:

Tasks: RI-01-03; RI-05; RI-11; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (6)
b. Crouse (1)

Student Manuals:

Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Seal puller and installer
b. Hand tools
c. Transmission removal tools
d. Shop manual

CLASSROOM HOURS

6

EVALUATION (PT-24)

a. Given a vehicle with a defective converter, and proper tools, equipment, and service manuals, the learner will complete task as recommended by manufacturer. Repair will not cause damage to other parts and there are to be no leaks.

b. Crouse & Anglin, Workbook

c. Hughes, Guide to the Automobile Mechanics Certification Exam

d. V'TECS, Automotive Mechanics, Task No. 62

e. Oklahoma, Auto Mechanics II

TASK

PT-25 Diagnosing automatic transmission problems

PERFORMANCE OBJECTIVE

Develop a troubleshooting plan for locating problems in the automatic transmission.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Automatic transmission theory of operation
b. Automatic transmission make up
c. Determining problems by noise and action of transmission

Provide Demonstration On:

Diagnosing automatic transmission problems using shop manual troubleshooting chart

Provide Practical Application On:

Have the learner perform a transmission diagnosis using a troubleshooting plan

Related Instructions:

Tasks: RI-01; RI-03-05; RI-15

INSTRUCTIONAL MATERIALS

Textbooks:

a. Crouse & Anglin (6)
b. Crouse (1)

A/Vs:

a. Prentice-Hall,"Automatic Transmission Maintenance" (Filmstrip #1)
b. Ford, "Automatic Transmission Diagnosis" (Filmstrip 1701-201)

Student Manuals:

a. Georgia Auto Mechanics Program (242-1)
b. Oklahoma, Auto Mechanics II

Tools and Equipment:

a. Hand tools
b. Measuring device
c. Specifications
d. Auto shop repair manual
e. Diagnosis chart

CLASSROOM HOURS

10

EVALUATION (PT-25)

a. Given a vehicle equipped with an automatic transmission and necessary tools, equipment, and data, the learner will develop a troubleshooting plan to locate the problem in double the flat rate time.

b. Crouse & Anglin, Workbook

c. Hughes, Guide to the Automobile Mechanic Certification Exam

d. Oklahoma, Auto Mechanics II

SECTION VI

REFERENCES, RESOURCES

INSTRUCTIONAL RESOURCE MATRIX

Introduction

The following Instructional Resource Matrix lists the instructional resources required to carry out the learning activities in each unit in the program. The resources are divided into the following categories: audio visuals, textbooks and student manuals.

Audio visuals and audio visual producers are identified by the following symbols: filmstrip (FS), slide/script (SS), slide/tape (ST), movie film (MF), transparencies (TR), and filmloops (FL). Producers are identified as follows: American Association for Vocational Instructional Materials (AAVIM), Automated Training, Inc. (ATI), Bergwall (BW), Georgia Department of Education (GA), Mid-America Vocational Curriculum Consortium (MAVCC), Oklahoma Materials Center (OK) and Prentice-Hall (PH). Audio visuals available from the State of Georgia are either post secondary or secondary. Both are included in the matrix and can be used interchangeably with each unit guide. Post Secondary audio visuals and materials are designated by numbers (i.e., 231-1) and secondary materials are identified by letter prefixes and numbers (i.e., HB-1).

Textbooks are identified by author. The complete reference can be found in the Textbook List at the end of this section and addresses are included in the Additional Resources section. Authors with more than one publication are identified by number.

Student manuals produced by Georgia are identified by unit number and title. Other materials are identified by publisher.

CURRICULUM AREA: Auto Mechanics
Major Block: Related Instruction

TASK LISTING		INSTRUCTIONAL MATERIAL REFERENCES		
		Audio-Visuals	Textbooks	Student Materials
RI-01	Demonstrating and utilizing school and lab policies and procedures	AAVIM, Developing Shop Safety Skills (ST) GA, 101-1, 2, 3, 4	AAVIM Ohio State	GA 101-1 Intro to indiv. instr. 101-2 Operating cassette player 101-3 Operating filmstrip projector 101-4 Operating filmloop projector Local School Policies AAVIM, Developing Shop Safety Skills
RI-02	Maintaining a parts inventory	B & S, Microfiche (ST)	GMC (ED 022 971)	
RI-03	Reading and interpreting the shop service manuals			
RI-04	Completing job work order forms			
RI-05	Identifying and maintaining shop tools and equipment	BW, Automotive Hand Tools Explained (FS) PH, Auto Mechanics Tools and Basic Skills (FS)	Crouse & Anglin (5)	MAVCC, Automotive or small engine repair programs
RI-06	Using precision measurement tools and equipment	Georgia Metals Cluster, M-1 (ST) PH, Machine Shop Bench Operations (FS)	Stovett	Georgia Metals Cluster, M-1

Major Block: Related Instruction (cont'd)

TASK LISTING		INSTRUCTIONAL MATERIAL REFERENCES		
		Audio-Visuals	Textbooks	Student Materials
RI-07	Demonstrating engine theories of operation	BW, The Internal Combustion Engine Explained (FS); The Four Cycle Engine Explained (FS) PH, The Basic Engine (FS)	AAVIM, Vol. 1, 2 B & S Brady Glenn Mitchell Pipe Stephenson Stockel (1)	
RI-08	Demonstrating a knowledge of electricity fundamentals	AAVIM, Understanding Electricity and Electrical Terms (ST), (TR) PH, Basic Automotive Service (FS); Auto Mechanics Tools and Basic Skills (FS) BS, Custom VOA Meter (ST); Glossary of Electrical Terms (SS); Electricity and Basic Electrical Terms (ST)	AAVIM	
RI-09	Demonstrating a knowledge of fuels	Shell Film Library AAVIM, Selecting Fuels and Lubricants (ST), (TR)	AAVIM Crouse (1) Stockel (1)	

Major Block: Related Instruction (cont'd)

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
RI-10 Demonstrating a knowledge of lubricants		AAVIM, Vol. 1, 2 Crouse (1) Stockel (1)	
RI-11 Demonstrating a knowledge of hardware and fasteners	PH, Auto Mechanics Tools and Basic Skills		
RI-12 Demonstrating basic metal operations	GA, HT-3, 4 (ST) PH, Machine Shop Bench Operations (FS)		GA HT-3 Making a thread block gauge HT-4 Removing broken stud and installing Helicoil HT-5 Cutting and double flaring copper tubing
RI-13 Demonstrating welding and soldering techniques	Georgia Metals Cluster, BW-5; GC-1-5; GW-1-9 (ST) Scott, Electric Welding (FL) Delmar, Basic Oxyacetylene Welding (FL)	Althouse	Georgia Metals Cluster BW-5 Brace welding lap joints GC-1-5 Gas cutting GW-1-9 Gas welding
RI-14 Demonstrating a knowledge of applied mathematics	PH, Metrics for Auto Mechanics (FS)	GA, Vocational Mathematics Olivio Wilton & Rogers	GA, Transportation Mathematics SM.7.35

Major Block: Related Instruction (cont'd)

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
RI-15 Demonstrating a knowledge of applied science		Crouse (1) Jensen Pipe	AAVIM, Ball and roller bearings

CURRICULUM AREA: Auto Mechanics
Major Block: Automotive Systems Repair

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AS-01 Checking and changing engine oil and oil filter	GA, CL-1, 2; 212-2 (ST) BW, Lubrication Services (FS) PH, Basic Automotive Service (FS)	Glenn Remling (1) Toboldt & Johnson	GA CL-1 Using the twin post hoist CL-2 Change oil and filter 212-2 Servicing engine OK, Student Manual Vol. 1
AS-02 Checking fluid level and refilling transmission and rear end	GA, CL-5 (ST) BW, Lubrication Services (FS) PH, Basic Automotive Service (FS)	Crouse & Anglin (1) (8) Remling (1)	GA CL-5 Change automatic transmission fluid OK, Student Manual Vol. 1
AS-03 Lubricating chassis and components	GA, CL-4; 212-3 (ST) BW, Lubrication Services (FS) PH, Basic Automotive Service (FS)	Crouse & Anglin (1) (8) Remling (1) Stockel (1)	GA CL-4 Lubricate body friction points 212-3 Lubricating chassis
AS-04 Checking and replacing windshield wiper blades		Crouse & Anglin (1)	
AS-05 Repairing tires and tubes	GA, SSS-3 (ST) PH, Basic Automotive Service (FS)	Crouse & Anglin (1) (8) Toboldt & Johnson	GA SSS-3 Dismount and remount a tire OK, Student Manual Vol. 1

Major Block: Automotive Systems Repair (cont'd)

TASK LISTING		INSTRUCTIONAL MATERIAL REFERENCES		
		Audio-Visuals	Textbooks	Student Materials
AS-06	Replacing light bulbs and fuses	PH, Basic Automotive Service (FS)	Crouse & Anglin (1) (8) Remling (1) Stockel (1)	OK, Student Manual Vol. 1 Ellinger, Workbook
AS-07	Washing and waxing vehicle			Vehicle owners manual
AS-08	Performing state inspection		Billiet & Alley Crouse & Anglin (1) (8) Remling (1) Toboldt & Johnson	Georgia Motor Vehicle Inspection Manual OK, Student Manuals Vol. 1, 2
AS-09	Adjusting fuel/air mixtures and mechanical linkage	GA, FS-4 (ST) BW, The Operation of the Fuel System Explained (FS) Ford, Fuel and Carburetion (FS)	Crouse & Anglin (4) Stockel (1)	GA FS-4 Adjusting an overhauled carburetor OK, Student Manual Vol. 1 Ford, Student Manual
AS-10	Cleaning or replacing fuel and air filters	BW, The Operation of the Fuel System Explained (FS) GA, 213-10	Crouse & Anglin (4) Stockel (1)	GA 213-10 Servicing carburetor air cleaner OK, Student Manual Vol. 1
AS-11	Removing carburetor from engine	Ford, Carburetor-Two and Four Venturi (TR)	Crouse & Anglin (4) Stockel (1)	OK, Student Manual Vol. 1

Major Block: Automotive Systems Repair (cont'd)

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AS-12 Disassembling, cleaning and inspecting carburetor	GA, FS-3A, B; FS-5A, B; 213-3A, 213-4, 5, 6, 7 (ST) BW, The Operation of the Fuel System Explained (FS) Ford, Carburetor Service (ST) PH, Fuel Service (FS)	Crouse & Anglin (4) Stockel (2)	GA FS-3 Overhauling a single-barrel carburetor FS-5 Overhauling a two-barrel carburetor 213-3 Overhauling a single-barrel Rochester carburetor 213-4 Overhauling a single-barrel Ford carburetor 213-5 Overhauling a two-barrel Rochester carburetor 213-6 Overhauling a Chrysler product two-barrel carburetor 213-7 Overhauling a two-barrel Ford carburetor Ford, Student Manual OK, Student Manual Vol. 1
AS-13 Reassembling and testing carburetor	(Same as Task AS-12)	Crouse & Anglin (4) Stockel (2)	(Same as Task AS-12)
AS-14 Testing and replacing fuel pump	GA, FS-2; 213-2 (ST) BW, The Operation of the Fuel System Explained (FS)	Crouse & Anglin (4) Stockel (2)	GA FS-2 Testing and replacing the fuel pump 213-2 Testing and/or replacing fuel pump

Major Block: Automotive Systems Repair (cont'd)

TASK LISTING		INSTRUCTIONAL MATERIAL REFERENCES		
		Audio-Visuals	Textbooks	Student Materials
AS-15	Servicing fuel tank, lines, hoses and fuel level	GA, FS-I; 213-1 (ST) BW, The Operation of the Fuel System Explained (FS)	Crouse & Anglin (4) Stockel (2)	GA FS-1 Cleaning and repairing fuel system components 213-1 Cleaning or repairing fuel tanks and lines OK, Student Manual Vol. 1
AS-16	Diagnosing fuel system problems	GA, FS-1-5B (ST) BW, The Operation of the Fuel System Explained (FS)	Crouse & Anglin (4) Stockel (2)	OK, Student Manual Vol. 1 Ford, Student Manual
AS-17	Inspecting, selecting and installing spark plugs	GA, SPS-1-5; 223-9 (ST) BW, The Ignition System Explained (FS)	Crouse & Anglin (7) Wetzel	GA SPS-1 Removing spark plugs SPS-2 Cleaning spark plugs SPS-3 Gapping spark plugs SPS-4 Testing spark plugs SPS-5 Testing spark plugs for correct polarity 223-9 Cleaning or replacing spark plugs OK, Student Manual Vol. 1
AS-18	Timing the ignition	GA, TID-5 BW, The Ignition System Explained (FS)	Crouse & Anglin (7) Wetzel	GA TID-5 Setting the timing OK, Student Manual Vol. 1
AS-19	Inspecting and replacing circuit wiring, distributor cap and rotor	GA, 223-8 BW, The Ignition System Explained (FS)	Crouse & Anglin (7) Wetzel	GA 223-8 Replacing distributor cap and spark plug wires OK, Student Manual Vol. 1

Major Block: Automotive Systems Repair (cont'd)

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AS-20 Testing, removing and replacing battery ignition components	GA, TIC-1, 2; TID-3; 223-10A (ST); 223-10B (FS) Ford, Ignition Systems (ST); Ignition System Principles of Operation (FS) BW, How to do a Major Tune-up (FS); Ignition System Explained (FS) PH, Electrical Ignition Service (FS)	Crouse & Anglin (7) Wetzel	GA TIC-1 Testing ignition coil TIC-2 Testing the condenser TID-3 Installing points in a distributor 223-10 Testing ignition coil Ford, Student Manuals OK, Student Manual Vol. 2
AS-21 Testing, removing and replacing electronic ignition components	GA, 262-4 (ST) BW, Electronic Ignition Explained (FS) Ford, Solid State Ignition Systems (ST) PH, Electronic Ignition Service (FS)		GA 262-4 Testing and servicing transistor ignition system Ford, Student Manual OK, Student Manual

Major Block: Automotive Systems Repair (cont'd)

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AS-22 Using and interpreting the ignition analyzer	GA, STE-3-6; 223-12 (ST); 223-12A, B (FL) BW, The Ignition System Explained (FS) Ford, Ignition System Diagnosis and Adjustment (TR)	Crouse & Anglin (7) Johnson Sun Wetzel	GA STE-3 Performing engine tests STE-4 Identifying scope patterns STE-5 Testing firing system STE-6 Using sun ten-twenty tester 223-12 Performing on car fuel system tests
AS-23 Diagnosing ignition system problems	BW, The Ignition System Explained (FS) PH, Electrical Ignition Service (FS); Electronic Ignition Systems (FS)	Crouse & Anglin (7) Johnson Sun Wetzel	
AS-24 Servicing battery and cables	GA, TSB-1-5; 201-4A (ST); 201-4B (FS) PH, Basic Automotive Service (FS); How the Automobile Works (FS)	Crouse & Anglin (1) Wetzel	GA TSB-1 Testing battery gravity TSB-2 Performing light load test TSB-3 Testing battery capacity TSB-4 Cleaning the battery TSB-5 Charging the battery 201-4 Testing and servicing storage battery OK, Student Manual Vol. 2

Major Block: Automotive Systems Repair (cont'd)

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AS-25 Replacing and rebuilding solenoids and switches	GA, 222-5B (ST); 222-5A (FS) BW, The Automotive Starting System Explained (FS)	Crouse & Anglin (1) Johnson Wetzel	GA 222-5 Servicing cranking system controls OK, Student Manual Vol. 2
AS-26 Removing and replacing the starter	GA, TSM-2 (ST) BW, The Automotive Starting System Explained (FS)	Crouse & Anglin (1) Wetzel	GA TSM-2 Removing and no load testing a starter motor OK, Student Manual Vol. 2
AS-27 Disassembling and inspecting the starter components	GA, TSM-2, 3; 222-2, 3, 4 (ST) BW, The Starting System Explained (FS) Ford, Battery and Starting Systems (ST) PH, Servicing Automobile Electric Starters (FS)	Crouse & Anglin (1) Wetzel	GA TSM-2 Removing and no load testing a starter motor TSM-3 Performing an armature and field open and grounded circuit test 222-2 Overhauling cranking motor (Delco Remy) 222-3 Overhauling cranking motor (Ford) 222-4 Overhauling gear reduction cranking motor (Chrysler) Ford, Student Manual OK, Student Manual Vol. 2

Major Block: Automotive Systems Repair (cont'd)

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AS-28 Reconditioning the starter components	GA, TSM-4 (Also see Task AS-27) BW, The Starting System Explained (FS) PH, Servicing Automobile Electric Starters (FS)	Crouse & Anglin (1) Johnson Wetzel	GA TSM-4 Testing components, assembling and installing a starter OK, Student Manual Vol. 2
AS-29 Reassembling and testing the starter	GA, TSM-4A, B (ST) BW, The Starting System Explained (FS)	Crouse & Anglin (1) Johnson Wetzel	GA TSM-4 Testing components, assembling and installing a starter 223-2 Testing cranking system OK, Student Manual Vol. 2
AS-30 Diagnosing starting problems	GA, TSM-1-4; 222-1C (ST); 222-1A (FS) BW, The Starting System Explained (FS)	Crouse & Anglin (1) Johnson Wetzel	GA 222-1 Troubleshooting cranking systems OK, Student Manual Vol. 2
AS-31 Testing the DC generator and regulator	GA, 221-5A (FS); 221-5B (ST) PH, How the Automobile Works (FS)	Crouse & Anglin (1) Wetzel	GA TCS-1 Polarizing and troubleshooting a DC generator 221-1 Testing a DC charging system 221-1 Testing, setting and/or replacing a DC regulator OK, Shop Manual Vol. 2

Major Block: Automotive Systems Repair (cont'd)

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AS-32 Testing the alternator and regulator	GA, 221-6 (ST) Ford, Charging System-Alternator (ST)	Crouse & Anglin (1) Johnson Wetzel	GA TCS-3 Inspecting and testing alternator system TCS-4 Performing current output and circuit resistance test 221-6 Testing an AC charging system (conventional type) Ford, Student Manual OK, Student Manual Vol. 2
AS-33 Removing, disassembling and inspecting the generator		Crouse & Anglin (1) Wetzel	OK, Student Manual
AS-34 Rebuilding the generator	GA, 221-2, 3, 4A, B (ST)		GA 221-2 Overhauling a DC generator 221-3 Turning armature and undercutting mica 221-4 Bench testing a DC generator OK, Student Manual Vol. 2
AS-35 Removing, disassembling and inspecting the alternator	GA, 221-7, 8, 9A; 261-3A, B; 261-4B (ST); 221-9B; 261-4A (FS) Ford, Charging System-Alternator (TR) PH, Electrical Ignition Service (FS)	Crouse & Anglin (1) Johnson Wetzel	GA TCS-5 Removing and disassembling the alternator TCS-6 Bench testing the alternator TCS-7 Disassembling an alternator (CONTINUED)

Major Block: Automotive Systems Repair (cont'd)

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AS-35 CONTINUED			TCS-8 Performing rotor and stator tests TCS-9 Testing diodes 221-7 Overhauling an AC generator (conventional GM) 221-8 Overhauling a Ford motor type 221-9 Overhauling AC generator 261-4 Testing and repairing a transistorized Ford type AC generator Ford, Student Manual OK, Student Manual Vol. 2
AS-36 Rebuilding the alternator	(See Task AS-35)	Crouse & Anglin (1) Johnson Wetzel	GA TCS-10 Assembling and installing an alternator (Also see AS-35)
AS-37 Removing and replacing generators and alternators		Crouse & Anglin (1) Johnson Wetzel	OK, Student Manual Vol. 2
AS-38 Diagnosing charging system problems	Ford, Charging System Diagnosis (FS)	Crouse & Anglin (1) Johnson Wetzel	Ford, Student Manual OK, Student Manual Vol. 2

Major Block: Automotive Systems Repair (cont'd)

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AS-39 Checking coolant level and freezing point	GA, SCS-2, 212-1 (ST) BW, The Automotive Cooling System Explained (FS); How to Service the Cooling System (FS) Ford, Cooling System-Principles of Operation (SS) PH, How the Automobile Works (FS)	Stockel (1) Toboldt & Johnson Wetzel	GA SCS-1 Check anti-freeze and pressure test cooling system 212-1 Servicing cooling system Ford, Student Manual OK, Student Manual Vol. 1
AS-40 Cleaning and flushing the system	GA, SCS-2 (ST) BW, Auto Cooling System Explained (FS)	Stockel (1) Toboldt & Johnson Wetzel	GA SCS-2 Flush and winterize cooling system OK, Student Manual Vol. 1
AS-41 Inspecting, adjusting or replacing fan belts and hoses	BW, Auto Cooling System Explained (FS) PH, Working with Hoses (FS)	Stockel (1) Toboldt & Johnson Wetzel	GA SCS-3 Replace radiator and heater hose SCS-6 Replace and adjust drive belts OK, Student Manual Vol. 1
AS-42 Testing system with pressure	GA, SCS-2 (ST)	Stockel (1) Toboldt & Johnson Wetzel	GA SCS-2 Flush and winterize cooling system OK, Student Manual Vol. 1

Major Block: Automotive Systems Repair (cont'd)

TASK LISTING		INSTRUCTIONAL MATERIAL REFERENCES		
		Audio-Visuals	Textbooks	Student Materials
AS-43	Removing, repairing and replacing the radiator	GA, SCS-4 (ST) BW, Auto Cooling System Explained (FS)	Stockel (2) Toboldt & Johnson Wetzel	GA SCS-4 Remove and replace radiator OK, Student Manual Vol. 1
AS-44	Testing and replacing thermostats and radiator caps	GA, SCS-2 (ST) BW, Auto Cooling System Explained (FS)	Stockel (2) Toboldt & Johnson Wetzel	GA SCS-5 Replace thermostat and by-pass hose OK, Student Manual
AS-45	Replacing the variable speed fan	BW, Auto Cooling System Explained (FS)	Stockel (2) Toboldt & Johnson Wetzel	GA SCS-7 Replace water pump and check fan clutch OK, Student Manual
AS-46	Replacing the water pump	BW, Auto Cooling System Explained (FS)	Stockel (2) Toboldt & Johnson Wetzel	GA SCS-7 Replace water pump and check fan clutch OK, Student Manual
AS-47	Repairing the heater controls		Stockel (2) Toboldt & Johnson Wetzel	OK, Student Manual
AS-48	Removing, repairing and replacing the heater core	BW, Auto Cooling System Explained (FS)	Stockel (2) Toboldt & Johnson Wetzel	OK, Student Manual

Major Block: Automotive Systems Repair (cont'd)

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AS-49 Diagnosing engine heating and cooling system problems	GA, SCS-2, 4 (ST) BW, Auto Cooling System Explained (FS)	Stockel (2) Toboldt & Johnson Wetzel	GA SCS-2 Flush and winterize cooling system SCS-4 Remove and replace radiator OK, Student Manual
AS-50 Identifying brake system components	GA, 231-1A, B; HB-1 (ST) Ford, Evolution of Brakes (FS) ATI, Brake Servicing (FL) PH, Hydraulic Brake Service (FS)	Crouse & Anglin (1) Remling (2) Stockel (1) (2) Toboldt & Johnson	GA HB-1 Checking the brake system condition and operation 231-1 Checking brake system condition and operation MAVCC, Student Manual OK, Student Manual
AS-51 Adjusting brakes	GA, HB-1; 231-1A, B (ST)	Remling (2) Stockel (1) (2) Toboldt & Johnson	GA HB-1 Checking the brake system condition and operation 231-1 Checking brake system condition and operation MAVCC, Student Manual OK, Student Manual Vol. 1
AS-52 Removing and rebuilding brake cylinders	GA, HB-2A, B; HB-3, 7; 231-2, 4, 9 (ST) ATI, Brake Servicing (FL) PH, Hydraulic Brake Service (FS)	Crouse & Anglin (1) Remling (2) Stockel (1) (2) Toboldt & Johnson	GA HB-2 Overhauling a master cylinder HB-3 Overhauling and/or replacing a wheel cylinder (CONTINUED)

Major Block: Automotive Systems Repair (cont'd)

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AS-52 CONTINUED			HB-7 Bleeding brake system 231-2 Overhauling master cylinder 231-4 Overhauling and/or replacing wheel cylinders 231-9 Bleeding brake system MAVCC, Student Manual OK, Student Manual Vol. 1
AS-53 Removing and rebuilding brake calipers	PH, Hydraulic Brake Service (FS)	Crouse & Anglin (1) Remling (2) Stockel (1) (2) Toboldt & Johnson	MAVCC, Student Manual OK, Student Manual Vol. 1
AS-54 Replacing brake shoes and pads	GA, HB-5, 6, 9; 231-6, 7, 12 (ST) PH, Hydraulic Brake Service (FS)	Crouse & Anglin (1) Remling (2) Stockel (1) (2) Toboldt & Johnson	GA HB-5 Cam grinding brake shoes HB-6 Replacing brake shoes HB-9 Replacing front disc pads 231-6 Cam grinding brake shoes 231-7 Replacing brake shoes 231-12 Replacing front disc pads MAVCC, Student Manual OK, Student Manual Vol. 1
AS-55 Machining brake drums	GA, HB-8; 231-5 (ST) ATI, Brake Servicing (FL)	Remling (2) Toboldt & Johnson	GA HB-8 Grinding brake drums 231-5 Turning brake drum MAVCC, Student Manual OK, Student Manual

Major Block: Automotive Systems Repair (cont'd)

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AS-56 Machining brake rotors	GA, HB-11 (ST) ATI, Brake Servicing (FL)	Remling (2)	GA HB-11 Machine a disc brake rotor MAVCC, Student Manual OK, Student Manual
AS-57 Replacing hydraulic control valves and lines	GA, 102-4 (ST)	Crouse & Anglin (1) Remling (2) Stockel (1) (2) Toboldt & Johnson	GA 102-4 Cutting and flaring tubing MAVCC, Student Manual OK, Student Manual
AS-58 Replacing power brake units		Crouse & Anglin (1) Remling (2) Stockel (1) (2) Toboldt & Johnson	GA 231-13 Replace power brake unit MAVCC, Student Manual OK, Student Manual
AS-59 Diagnosing brake system problems	GA, HB-1; 231-1A, B (ST); 231-1B (FL) Ford, Drum and Disc Brakes (SS)	Crouse & Anglin (1) Remling (2) Stockel (1) (2) Toboldt & Johnson	GA HB-1 Checking the brake system condition and operation 231-1 Checking brake system condition and operation Ford, Student Manual Vol. 1 MAVCC, Student Manual OK, Student Manual Vol. 1

Major Block: Automotive Systems Repair (cont'd)

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AS-60 Identifying suspension system components	BW, The Front End Explained (FS) PH, How the Automobile Works (FS) Ford, Front and Rear Suspension Systems (SS)	Bacon Billiet & Alley Crouse & Anglin (1) Remling (3)	GA CL-6 Pack front wheel bearings (drum type brakes) CL-7 Pack front wheel bearings (disc type brakes) 232-9 Cleaning and packing front wheel bearings OK, Student Manual
AS-61 Inspecting suspension system components	GA, 232-1A (ST) BW, The Front End Explained (FS)	Bacon Billiet & Alley Crouse & Anglin (1) Remling (3)	GA 232-1 Inspecting steering linkage and suspension OK, Student Manual Vol. 1
AS-62 Lubricating and adjusting front wheel bearings	GA, CL-6, 7 (ST) BW, The Front End Explained (FS) PH, Steering and Suspension Systems (FS)	Bacon Billiet & Alley Crouse & Anglin (1) Remling (3)	GA CL-6 Pack front wheel bearings (drum type brakes) CL-7 Pack front wheel bearings (disc type brakes) 232-9 Cleaning and packing front wheel bearings OK, Student Manual Vol. 1
AS-63 Replacing shock absorbers		Bacon Billiet & Alley Crouse & Anglin (1) Remling (3)	OK, Student Manual Vol. 1

Major Block: Automotive Systems Repair (cont'd)

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AS-64 Replacing front coil springs and rear leaf springs	GA, 232-13 (ST)	Bacon Billiet & Alley Crouse & Anglin (1) Remling (3)	GA 232-12 Replacing coil springs lower (control arm mounted) 232-13 Replacing coil springs upper (control arm mounted)
AS-65 Changing and balancing wheels and tires	GA, SSS-2, 3, 6A, 6B (ST); 232-7A, B, C; 232-8A, B; 232-10 (FL) Ford, Tire Problem Analysis (FS) PH, Basic Automotive Service (FS); Wheel Balancing (FS)	Bacon Billiet & Alley Crouse & Anglin (1) Remling (3)	GA SSS-2 Static or bubble balance wheels SSS-3 Dismount and remount a tire SSS-6 Speed balance a wheel on the car 232-7 Balancing front wheels 232-8 Balancing rear wheels 232-10 Truing tires OK, Student Manual Vol. 1
AS-66 Replacing upper and lower control arms and bushings	GA, 232-15 (ST)	Bacon Billiet & Alley Crouse & Anglin (1) Remling (3)	GA 232-15 Replacing ball joints and control arm bushings OK, Student Manual Vol. 1
AS-67 Replacing upper and lower ball joints	GA, 232-15 (ST) BW, The Front End Explained (FS) PH, Steering and Suspension Systems (FS)	Bacon Billiet & Alley Crouse & Anglin (1) Remling (3)	GA 232-15 Replacing ball joints and control arm bushings OK, Student Manual Vol. 1

Major Block: Automotive Systems Repair (cont'd)

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AS-68 Replacing king pins and bushings		Bacon Billiet & Alley Crouse & Anglin (1)	
AS-69 Replacing torsion bars	GA, 232-11 (FL) PH, Steering and Suspension Systems (FS)	Bacon Billiet & Alley Crouse & Anglin (1) Remling (3)	GA 232-11 Replacing and adjusting torsion bars
AS-70 Replacing twin I-beams	Ford, Twin I-Beam Front Suspension (FS)	Bacon Billiet & Alley Crouse & Anglin (1)	Ford, Student Manual
AS-71 Diagnosing suspension system problems	GA, 282-6A, B (FS)	Bacon Billiet & Alley Crouse & Anglin (1) Remling (3)	GA 282-6 Troubleshooting suspension and handling problems
AS-72 Identifying steering system components	GA, SSS-7A, B (ST)	Billiet & Alley Crouse & Anglin (1) Dwiggins Remling (3) Stockel (1)(2 Toboldt & Johnson	OK, Student Manual Vol. 1 Ford, Student Manual

TASK LISTING		INSTRUCTIONAL MATERIAL REFERENCES		
		Audio-Visuals	Textbooks	Student Materials
AS-73	Adjusting manual steering gear	GA, 233-1 (ST)	Billiet & Alley Crouse & Anglin (1) Dwiggins Remling (3) Stockel (1) (2) Toboldt & Johnson	GA 233-1 Adjusting steering gear OK, Student Manual Vol. 1
AS-74	Inspecting and replacing steering gear linkage	GA, SSS-7A, B; 232-14 (ST)	Billiet & Alley Crouse & Anglin (1) Dwiggins Remling (3) Stockel (1) (2) Toboldt & Johnson	GA SSS-7 Inspect front suspension 232-14 Replacing steering linkage
AS-75	Replacing power steering unit	Ford, Car Power Steering (FS) GA, 283-3, 4, 6 (ST); 283-5 (FS)	Dwiggins Remling (3)	GA 283-1 Adjusting power steering gear 283-2 Removing and replacing power steering gear 283-3 Overhauling saginaw rotary valve power steering gear (CONTINUED)

Major Block: Automotive Systems Repair (cont'd)

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AS-75 CONTINUED			283-4 Overhauling late model Ford power steering gear 283-5 Overhauling late model Chrysler power steering gear 283-6 Overhauling a power steering pump OK, Student Manual Vol. 1
AS-76 Replacing steering column	GA, 233-4A (ST); 233-4B (FS)	Crouse & Anglin (1) Dwiggins Remling (3) Stockel (1) (2)	GA 233-4 Reconditioning energy absorbing steering column OK, Student Manual Vol. 1
AS-77 Aligning the front-end	GA, SSS-7A, B; SSS-8A, B, C (ST); 232-2B, 3B, 5B (FL); 232-6B, C (FS)	Crouse & Anglin (1) Dwiggins Remling (3) Stockel (1) (2) Toboldt & Johnson	GA SSS-7 Inspect front suspension SSS-8 Align front suspension 232-2 Setting caster 232-3 Setting camber 232-4 Checking steering axis inclination and turning radius 232-5 Setting toe-in and straight ahead 232-6 Inspecting and aligning front end Ford, Student Manual OK, Student Manual Vol. 1

Major Block: Automotive Systems Repair (cont'd)

TASK LISTING		INSTRUCTIONAL MATERIAL REFERENCES		
		Audio-Visuals	Textbooks	Student Materials
AS-78	Diagnosing steering system problems	GA, 282-6A, B (FS) SSS-7A, B (ST)	Crouse & Anglin (1) Dwiggins Remling (3) Stockel (1) (2) Toboldt & Johnson	GA 282-6 Troubleshooting suspension and handling problems SSS-7 Inspect front suspension OK, Student Manual Vol. 1
AS-79	Identifying emission control components	GA, AEC-1 (ST) PH, Servicing Ford and General Motors Emission Control Systems (FS) Ford, Emission Control Systems (SS)	Crouse & Anglin (2) Johnson Wetzel	GA AEC-1 Automotive emissions that require control 262-11 (Same as above) MAVCC, Student Manual Ford, Student Manual
AS-80	Measuring exhaust emissions	GA, STE-8A, B; 262-5B (ST) BW, Infra-red Exhaust Analyzer (FS)	Crouse & Anglin (2) Johnson Wetzel	GA AEC-2 Emission analyzer operation 262-12 (Same as above) MAVCC, Student Manual
AS-81	Testing and replacing components in the positive crankcase	GA, AEC-4 (ST)	Crouse & Anglin (2) Johnson Wetzel	GA AEC-4 Testing PCV system 262-14 (Same as above) MAVCC, Student Manual

Major Block: Automotive Systems Repair (cont'd)

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AS-82 Testing and replacing components in the fuel	GA, AEC-7 (ST)	Crouse & Anglin (2)	GA AEC-7 Testing the fuel evaporative control system 262-17 (Same as above) MAVCC, Student Manual
AS-83 Testing and replacing components in the exhaust gas recirculation (EGR) system	GA, AEC-8 (ST)	Crouse & Anglin Johnson Wetzel	GA AEC-8 Testing the EGR system 262-18 (Same as above) MAVCC, Shop Manual
AS-84 Testing and replacing the catalytic converter	GA, AEC-10 (ST)	Crouse & Anglin Johnson Wetzel	GA AEC-10 Performance testing the catalytic converter system 262-20 (Same as above) MAVCC, Shop Manual
AS-85 Testing and replacing components in the thermostatic air cleaner system	GA, AEC-5 (ST) PH, Servicing Ford and General Motors Emission Control Systems (FS)	Crouse & Anglin Johnson Wetzel	GA AEC-5 Checking thermostatic air cleaner operation 262-15 (Same as above) MAVCC, Student Manual
AS-86 Testing and replacing components in the air injection reaction (AIR) system	GA, AEC-6 (ST) PH, Servicing Ford and General Motors Emission Control Systems (FS)	Crouse & Anglin (2) Johnson Wetzel	GA AEC-6 Testing the air injection reaction system 262-16 (Same as above) MAVCC, Student Manual

Major Block: Automotive Systems Repair (cont'd)

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AS-87 Testing and replacing components in the spark control system	GA, AEC-9 (ST) PH, Servicing Ford and General Motors Emission Control Systems (FS)	Crouse & Anglin (2) Johnson Wetzel	GA AEC-9 Performance testing the spark control system 262-19 (Same as above) MAVCC, Student Manual
AS-88 Removing and replacing exhaust pipes, mufflers and tail pipes	GA, FS-6, 213-9 (ST)	Crouse & Anglin (2) Johnson Remling (1) Wetzel	GA FS-6 Repairing the exhaust system 213-9 Servicing exhaust system
AS-89 Diagnosing emission control and exhaust system problems	GA, 223-13A (ST); 223-13B (FS) BW, Infra-red Exhaust Analyzer (FS) PH, Servicing Ford and General Motors Emission Control Systems (FS)	Crouse & Anglin (2) Johnson Wetzel	GA 223-13 Performing tests and servicing emission controls MAVCC, Student Manual

CURRICULUM AREA: Auto Mechanics
Major Block: Automotive Engine Overhaul

TASK LISTING		INSTRUCTIONAL MATERIAL REFERENCES		
		Audio-Visuals	Textbooks	Student Materials
AE-01	Identifying component parts	BW, The Internal Combustion Engine Explained (FS)	Crouse (1) Stockel (1)	OK, Student Manual Vol. 2
AE-02	Performing the cylinder compression and leakage test	GA, 223-1 (ST) BW, Problems of the Internal Combustion Engine Explained (FS)	Crouse (1) Stockel (1), (2)	GA 223-1 Testing engine internal condition OK, Student Manual Vol. 2
AE-03	Adjusting the valves	GA, VGA-12, 211-17a (ST); 211-17b, c (FL)	Crouse (1) Stockel (1), (2)	GA VGA-12 Installing rocker arms and adjusting valves 211-17 Reconditioning and installing rocker arms and adjusting valves OK, Student Manual Vol. 2
AE-04	Removing the cylinder head(s)	GA, VGA-1 PH, Automotive Engine Overhaul (FS)	Crouse (1)	GA VGA-1 Removing, disassembling and cleaning cylinder head OK, Student Manual Vol. 2
AE-05	Removing and inspecting the valves and component parts	PH, Cylinder Head Service (FS)	Crouse (1) Stockel (2)	OK, Student Manual Vol. 2

Major Block: Automotive Engine Overhaul (cont'd)

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AE-06 Refacing the vlaves and valve stems	GA, VGA-2, 4, 4b, 5, 211-6A, 211-6A1, (ST); 211-6B, C (FL) Sioux, Reconditioning the Cylinder Head (MF) BW, How to use a Valve and Seat Refacer (FS) PH, Cylinder Head Service (FS)	Crouse (1) Stockel (2)	GA VGA-2 Inspecting and adjusting valve grinding machinery VGA-3 Dressing a grinding stone VGA-4 Grinding valves VGA-5 Squaring off valve stems 211-6 Grinding valves and chamfering stems OK, Student Manual Vol. 2
AE-07 Inspecting the cylinder head	GA, VGA-6 BW, How to Overhaul an Engine (FS)	Crouse (1) Stockel (2)	GA VGA-6 Reconditioning valve guides OK, Student Manual Vol. 2
AE-08 Grinding the valve seats	GA, VGA-7, 211-7A (ST); 211-7B, C (FL) BW, How to use a Valve and Seat Refacer (FS) PH, Cylinder Head Service (FS)	Crouse (1) Stockel (2)	GA VGA-7 Grinding and sizing valve seats 211-7 Reconditioning valve guides and grinding valve seats OK, Student Manual Vol. 2
AE-09 Servicing the rocker arm, push rod and lifter assemblies	GA, VGA-10, 11 (ST)	Crouse (1) Stockel (2)	GA VGA-10 Removing and cleaning valve lifters VGA-11 Reassembling valve lifters

Major Block: Automotive Engine Overhaul (cont'd)

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AE-10 Reassembling and replacing the cylinder head(s)	GA, VGA-8,9; 211-8A, 211-15A (ST); 211-8B, 211-15B (FL) PH, Cylinder Head Service (FS)	Crouse (1) Stockel (2)	GA VG-8 Assembling valves VG-9 Installing cylinder heads 211-8 Assembling cylinder head and valves 211-15 Installing cylinder heads OK, Student Manual Vol. 2
AE-11 Diagnosing problems in the valve train	GA, 211-20A, B (FS) BW, The Internal Combustion Engine Explained (FS)	Stockel (2)	GA 211-20 Troubleshooting and diagnosing engine problems OK, Student Manual Vol. 2
AE-12 Removing component parts		Glenn Stockel (1) (2) Toboldt & Johnson	OK, Student Manual Vol. 2
AE-13 Removing vibration damper		Glenn Stockel (1) (2)	OK, Student Manual Vol. 2
AE-14 Removing front cover		Glenn Stockel (1) (2)	OK, Student Manual Vol. 2
AE-15 Removing and replacing timing chain(s) and/or gears	GA, 211-13 (ST)	Glenn Stockel (1) (2)	OK, Student Manual Vol. 2

Major Block: Automotive Engine Overhaul (cont'd)

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AE-16 Replacing front cover and seal		Glenn	OK, Student Manual Vol. 2
AE-17 Diagnosing timing chain problems		Glenn Stockel (1) (2)	OK, Student Manual Vol. 2
AE-18 Removing engine from vehicle	GA, 211-3 (ST)	Stockel (2)	GA 211-3 Removing engine OK, Student Manual Vol. 2
AE-19 Removing and inspecting useable parts	BW, The Internal Engine Explained (FS) PH, Automobile Engine Overhaul (FS)	Stockel (2)	OK, Student Manual Vol. 2
AE-20 Assembling new and used parts on block assembly	GA, 211-18 PH, Automobile Engine Overhaul (FS)	Stockel (2)	GA 211-18 Installing oil pump, pan, manifold, housing, covers and accessories OK, Student Manual Vol. 2
AE-21 Installing engine assembly	GA, 211-19		GA 211-19 Installing engine OK, Student Manual Vol. 2
AE-22 Testing engine assembly	BW, How to Overhaul an Engine (FS)	Crouse (1) Stockel (2)	OK, Student Manual Vol.2

Major Block: Automotive Engine Overhaul (cont'd)

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AE-23 Diagnosing internal engine problems	GA, 211-20A, B BW, Problems of the Internal Combustion Engine Explained (FS)	Crouse (1) Stockel (2)	GA 211-20 Troubleshooting and diagnosing engine problems OK, Student Manual Vol. 2
AE-24 Disassembling engine	GA, 211-1 (ST); 251-1A, B (FS) PH, The Basic Engine (FS); Automotive Engine Overhaul (FS) BW, The Internal Combustion Engine Explained (FS)	Crouse (1) Stockel (2)	GA 211-1 Disassembling engine (V/8 or 6 cylinder) 251-1 Disassembling, cleaning and inspecting engine OK, Student Manual Vol. 2
AE-25 Cleaning and inspecting block and components	GA, 211-4, 211-10A (ST); 211-10B (FL) PH, Automobile Engine Overhaul (FS) Ford, Gasoline Engines-Repair Techniques (FS)	Crouse (1) Stockel (2)	GA 211-4 Cleaning engine and engine compartment 211-10 Removing and measuring crankshaft and camshaft Ford, Student Manual
AE-26 Preparing cylinder block	GA, 211-11A (ST); 211-11B, C (FL) PH, Automobile Engine Overhaul (FS)	Crouse (1) Stockel (2)	GA 211-11 Servicing cylinder block OK, Student Manual Vol. 2
AE-27 Installing cam bearings	PH, Automobile Engine Overhaul (FS)	Crouse (1) Stockel (2)	OK, Student Manual Vol. 2

Major Block: Automotive Engine Overhaul (cont'd)

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AE-28 Installing piston pins and rings	GA, 211-9A, 102-3 (ST); 211-9B, C, D (FL) PH, Automobile Engine Overhaul (FS) Ford, Gasoline Engines-Piston Ring Service (FL)	Crouse (1) Stockel (2)	GA 211-9 Removing and servicing pistons and rods 251-3 Testing connecting rods and installing piston on rod OK, Student Manual Vol. 2 Ford, Student Manual
AE-29 Installing crankshaft	GA, 211-12A, 13 (ST); 211-12B (FL) PH, Automobile Engine Overhaul (FS)	Crouse (1) Stockel (2)	GA 211-12 Installing crankshaft and rear oil seal 211-13 Installing camshaft and timing gears OK, Student Manual Vol. 2
AE-30 Installing pistons and rod bearings	GA, 211-14A (ST); 211-14B (FL) PH, Automobile Engine Overhaul (FS)	Crouse (1) Stockel (2)	GA 211-14 Installing pistons and rod assemblies OK, Student Manual Vol. 2
AE-31 Installing oil pump, oil pan and component parts	GA, 211-2, 211-18 PH, Automobile Engine Overhaul (FS)	Crouse (1) Stockel (2)	GA 211-2 Assembling engine (V/8 or 6 cylinder) OK, Student Manual Vol. 2
AE-32 Comparing the automotive gas and diesel engines	BW, The Four-cycle Diesel Engine Explained (FS) PH, Introduction to the Diesel Engine (FS)	Weathers & Hunter	OK, Student Manual

Major Block: Automotive Engine Overhaul (cont'd)

TASK LISTING		INSTRUCTIONAL MATERIAL REFERENCES		
		Audio-Visuals	Textbooks	Student Materials
AE-33	Performing the cylinder compression leakage test	PH, Servicing the G.M. 5.7 Litre Diesel Engine (FS)	Weathers & Hunter	OK, Student Manual
AE-34	Removing and replacing fuel injectors	PH, Servicing the G.M. 5.7 Litre Diesel Engine (FS)	Weathers & Hunter	OK, Student Manual
AE-35	Removing and replacing the fuel injection pump	BW, The Four-cycle Diesel Engine Explained (FS) PH, Servicing the 5.7 Litre Diesel Engine (FS)	Weathers & Hunter	OK, Student Manual
AE-36	Removing and replacing the turbocharger		Weathers & Hunter	OK, Student Manual
AE-37	Removing the engine from the vehicle			
AE-38	Disassembling and inspecting the engine		Weathers & Hunter	OK, Student Manual
AE-39	Rebuilding the diesel engine		Weathers & Hunter	OK, Student Manual
AE-40	Installing the engine			
AE-41	Testing the engine			
AE-42	Diagnosing diesel engine problems	PH, Servicing the G.M. 5.7 Litre Diesel Engine (FS)	Weathers & Hunter	OK, Student Manual

CURRICULUM AREA: AUTO MECHANICS
Major Block: Automotive Accessories

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AA-01 Replacing wiring and making splices	GA, 201-2 (ST)	Crouse (2) Remling (1) Stockel (2)	GA 201-2 Replacing wire ends and splicing conductors OK, Student Manual Vol. 2 Ford, Student Manual
AA-02 Testing and maintaining electrical protection devices	GA, 221-6; 243-4 (ST)	Crouse (2) Remling (1) Toboldt & Johnson	GA 243-4 Troubleshooting lighting systems
AA-03 Testing and repairing the courtesy light	GA, 201-1A, B, C (FS); 243-4 (ST); Ford, Electrical Systems (ST)	Remling (1) Toboldt & Johnson	GA 201-1 Testing electrical wiring condition 243-4 Troubleshooting lighting systems OK, Student Manual Vol. 2
AA-04 Testing and repairing the parking light circuit	GA, 243-4A, B (ST)	Crouse (2) Remling (1) Toboldt & Johnson	GA 243-4 Troubleshooting lighting systems OK, Student Manual Vol. 2 Ellinger, Student Manual
AA-05 Testing and repairing the back up light circuit	GA, 243-4A, B (ST)	Crouse (2) Remling (1) Toboldt & Johnson	GA 243-4 Troubleshooting lighting systems OK, Student Manual Vol. 2 Ellinger, Student Manual

CURRICULUM AREA: Automotive Accessories

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AA-06 Testing and repairing the headlight circuit	GA, 243-A, B (ST) PH, Basic Automotive Service (FS)	Crouse (2) Remling (1) Toboldt & Johnson	GA 243-4 Troubleshooting lighting systems
AA-07 Testing and repairing the turn signal	GA, 243-4A, B (ST) PH, Basic Automotive Service (FS)	Crouse (2) Remling (1)	GA 243-4 Troubleshooting lighting systems OK, Student Manual Vol. 2
AA-08 Testing and repairing the brake light circuit	GA, 243-4A, B (ST)	Crouse (2) Remling (1) Toboldt & Johnson	GA 243-4 Troubleshooting lighting systems OK, Student Manual Vol. 2
AA-09 Testing and repairing the horn circuit	GA, 243-4A, B (ST)	Crouse (2) Toboldt & Johnson	GA 243-2 Repairing or replacing windshield wiper motor OK, Student Manual Vol. 2 Ellinger, Student Manual
AA-10 Testing and repairing the windshield wiper circuit	GA, 243-2A (ST); 243-2B (FS)	Toboldt & Johnson	GA 243-2 Repairing or replacing windshield wiper motor OK, Student Manual Vol. 2 Ellinger, Student Manual

CURRICULUM AREA: Automotive Accessories

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AA-11 Testing and repairing the windshield wiper circuit	GA, 243-2A (ST); 243-2B (FS) PH, Basic Automotive Service (FS)	Crouse (2) Toboldt & Johnson	GA 243-2 Repairing or replacing windshield wiper motor OK, Student Manual Vol. 2 Ellinger, Student Manual
AA-12 Testing and replacing instrument gauge and sending unit		Crouse (2)	OK, Student Manual Vol. 2
AA-13 Testing and repairing the cruise control unit		Crouse (2)	Ford, Student Manual
AA-14 Testing and repairing the automatic alarm system		Crouse (2)	Ellinger, Student Manual
AA-15 Testing and repairing the CB radio power circuit		Crouse (2) Schultz	
AA-16 Testing and trimming the CB radio antenna		Schultz	
AA-17 Testing and repairing power windows and seats	GA, 243-3 (ST)	Toboldt & Johnson	GA 243-3 Testing or replacing power window, seat motor or controls
AA-18 Testing and repairing fog lights		Crouse (2)	

CURRICULUM AREA: Automotive Accessories

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AA-19 Testing air conditioning system performance	GA, 243-A, B, C; 263-1 (ST)	Dwiggins (1)	GA 243-8 Performance testing air conditioning system 263-1 Performance testing air conditioner OK, Student Manual Notgrass, Student Manual
AA-20 Discharging the system	GA, 263-1 (ST) Ford, Air Conditioning Systems (ST)	Dwiggins (1)	GA 263-1 Performance testing air conditioner Ford, Student Manual OK, Student Manual Notgrass, Student Manual
AA-21 Evacuating and charging the system	GA, 243-10 (ST) PH, Automobile Air Conditioners (FS)	Dwiggins (1)	GA 243-10 Evacuating and charging air conditioning system OK, Student Manual Notgrass, Student Manual
AA-22 Rebuilding compressors	GA, 243-11A, B; 263-3, 4A, 4B (ST)	Dwiggins (1)	GA 243-11 Replacing compressor seal 263-3 Overhauling a York or Tecumseh compressor 263-4 Testing and overhauling a 6 cylinder GM type air conditioning compressor

CURRICULUM AREA: Automotive Accessories

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
AA-23 Replacing refrigerant lines and accessories	GA, 243-12A; 263-5 (ST)	Dwiggins (1)	GA 243-12 Replacing refrigerant hose dryer or filter 263-5 Testing and/or replacing a POA or expansion valve 263-6 Testing and/or replacing an EPR or ETR valve 263-7 Repairing or replacing a metal or flexible refrigerant line OK, Student Manual Notgrass, Student Manual
AA-24 Installing air conditioning units			GA 243-13 Installing add-on air conditioner
AA-25 Diagnosing air conditioning problems	PH, Automobile Air Conditioners (FS)	Dwiggins (1)	OK, Student Manual Notgrass, Student Manual

CURRICULUM AREA: AUTO MECHANICS
Major Block: Automotive Power Trains

TASK LISTING		INSTRUCTIONAL MATERIAL REFERENCES		
		Audio-Visuals	Textbooks	Student Materials
PT-01	Adjusting and repairing clutch and shift linkage	GA, 241-3 (ST) BW, The Automotive Clutch Explained (FS)	Crouse & Anglin (6) Crouse (1)	GA 241-3 Replacing clutch
PT-02	Removing and disassembling transmission	GA, 241-2-4 (ST) BW, The Automotive Standard Transmission Explained (FS) Ford, Manual Shift 3-speed Overdrive Transmissions (TP); Manual Shift 3-and 4-speed Transmissions (TP)	Crouse & Anglin (6) Crouse (1)	GA 241-2 Overhauling a 3-speed transmission 241-4 Overhauling syncromesh 4-speed transmission OK, Student Manual Vol. 2 Ford, Student Manual (5-speed)
PT-03	Inspecting and reassembling transmission	GA, 241-2, 4 (ST) BW, The Automotive Standard Transmission Explained (FS) PH, Servicing the Standard Transmission (FS)	Crouse & Anglin (6) Crouse (1)	GA 241-2 Overhauling a 3-speed transmission 241-4 Overhauling Syncromesh 4-speed transmission OK, Student Manual Vol. 2
PT-04	Removing and replacing clutch assembly	GA, 241-3 BW, The Automotive Clutch Assembly Explained (FS) PH, Servicing the Standard Clutch (FS)	Crouse & Anglin (6) Crouse (1)	GA 241-3 Replacing clutch OK, Student Manual Vol. 2 Ford, Student Manual

Major Block: Automotive Power Trains

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
PT-05 Removing and replacing the flywheel ring gear			
PT-06 Diagnosing manual transmission problems	GA, 241-2, 3, 4 (ST) BW, The Automotive Standard Transmission Explained (FS)	Crouse & Anglin (6) Crouse (1)	GA 241-2 Overhauling a 3-speed transmission 241-3 Replacing clutch 241-4 Overhauling syncromesh 4-speed transmission
PT-07 Inspecting drive shaft	GA, 241-1 (ST) PH, Servicing the Drive Shaft and Universal Joints (FS)	Crouse & Anglin (6) Crouse (1)	GA 241-1 Servicing u-joints and drive shafts OK, Student Manual Vol. 2
PT-08 Removing and replacing universal joints	GA, 241-1 (ST) PH, Servicing the Drive Shafts and Universal Joints (FS)	Crouse & Anglin (6) Toboldt & Johnson	GA 241-1 Servicing u-joints and drive shafts OK, Student Manual Vol. 2
PT-10 Removing and replacing rear axle bearings	GA, 241-7 (ST)	Crouse & Anglin	GA 241-7 Replacing and adjusting taper type rear axle bearing OK, Student Manual Vol. 2

Major Block: Automotive Power Trains

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
PT-11 Removing and disassembling diferential assembly	GA, 241-5A (ST), 241-5B, C; 241-6B, C (FS) BW, The Automotive Differential Explained (FS) and The Limited Slip Differential Explained (FS) Ford, Rear Axle and Drive Shaft (FS)	Crouse & Anglin (6) Crouse (1)	GA 241-5 Overhauling removable carrier type differential 241-6 Overhauling intergral carrier type differential OK, Student Manual Vol. 2 Ford, Student Manual
PT-12 Inspecting and reassembling differential assembly	GA, 241-5A (ST); 241-5B, C; 241-6B, C (FS) BW, The Automotive Differential Explained (FS) and The Limited Slip Differential Explained (FS) Ford, Rear Axle and Drive Shaft (FS)	Crouse & Anglin (6) Crouse (1)	GA 241-5 Overhauling removable carrier type differential 241-6 Overhauling intergral carrier type differential OK, Student Manual Vol. 2 Ford, Student Manual
PT-13 Removing and replacing front drive axle assembly		Crouse & Anglin (6)	
PT-14 Rebuilding four-wheel drive locking hubs			
PT-15 Rebuilding four-wheel drive transfer case			

Major Block: Automotive Power Trains

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
PT-16 Diagnosing drive line and rear end problems	GA 241-1 thru 7 (ST) BW, The Automotive Differential Explained and Universal Drive Shafts Explained (FS)	Crouse & Anglin (6) Crouse (1)	GA (Review filmstrips 241-1 thru 7) OK, Student Manual Vol. 2
PT-17 Testing the automatic transmission	Delmar, Hydraulic Control (FS) Ford, Transmission Models C-3, C-4, C-6, Jaxco FMX and Automatic Overdrive (TR)	Crouse & Anglin (6) Crouse (1)	Ford, Student Manuals OK, Student Manual
PT-18 Inspecting and adjusting shift linkage	GA, 242-2 (ST)	Crouse & Anglin (6) Crouse (1)	GA 242-2 Replacing linkage and modulator OK, Student Manual Vol. 2
PT-19 Removing and replacing automatic transmission oil filter	PH, Automatic Transmission Maintenance (FS) GA, 242-3 (ST)	Crouse & Anglin (6)	GA 242-3 Change transmission pump screen
PT-20 Testing and adjusting the automatic transmission modulator	GA, 242-2 (ST)	Crouse & Anglin (6)	GA 242-2 Adjusting linkage and replacing or adjusting modulator

CURRICULUM AREA: Automotive Power Trains

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
PT-21 Removing and disassembling transmission	BW, The Automatic Transmission Explained (FS) PH, Servicing the Automatic Transmission (FS) Ford, All Models (AV)	Crouse & Anglin (6) Crouse (1)	Ford, Student Manuals OK, Student Manual Vol. 2
PT-22 Inspecting and reassembling transmission	GA 271-1A, B; 271-2A, B (FS); 271-1E, F, G; 271-1A1, A2; 271-2C, D, E, F, G; 271-3C, D, E (ST) Ford, All Models (AV) PH, Servicing the Automatic Transmission (FS)	Crouse & Anglin (6) Crouse (1)	
PT-23 Testing transmission on bench	PH, Servicing the Automatic Transmission (FS)	Crouse & Anglin (6) Crouse (1)	OK, Student Manual
PT-24 Removing and replacing torque converter		Crouse & Anglin (6) Crouse (1)	GA 242-1 Troubleshooting automatic transmissions OK, Student Manual Vol. 2

Major Block: Automotive Power Trains

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audio-Visuals	Textbooks	Student Materials
PT-25 Diagnosing automatic transmission problems	PH, Automatic Transmission Maintenance (FS) Ford, Automatic Transmission Diagnosis (FS)	Crouse & Anglin (6) Crouse (1)	GA 242-1 Troubleshooting automatic transmissions OK, Student Manual Vol. 2

TEXTBOOK LIST

Althouse, A.D. Turnquist, C.H. & Bowditch, W.A., Modern Welding. South Holland, IL: Goodheart-Willcox, 1980.

American Association for Vocational Instructional Materials, Ball and Roller Bearings. Athens, GA: AAVIM, 1966.

American Association for Vocational Instructional Materials, Developing Shop Safety Skills. Athens, GA: AAVIM, 1979.

American Association for Vocational Instructional Materials, Selecting and Storing Fuels and Lubricants. Athens, GA: AAVIM, 1973.

American Association for Vocational Instructional Materials, Understanding Electricity and Electrical Terms. Athens, GA: AAVIM, 1974.

Bacon, E.M., Principles of Wheel Alignment Service (2nd ed.). Hightstown, NJ: McGraw-Hill, 1977.

Billiet, W.E. & Alley, W., Automotive Suspensions, Steering, Alignment and Brakes (5th ed.). Chicago, IL: American Technical.

(1) Crouse, W.H., Automotive Mechanics (8th ed.). Highstown, NJ: McGraw-Hill, 1980.

(2) Crouse, W.H., Automotive Electrical Equipment (8th ed.). Highstown, NJ: McGraw-Hill, 1976.

(1) Crouse, W.H. & Anglin, D.L., The Auto Book (2nd ed.). Highstown, NJ: McGraw-Hill, 1979.

(2) Crouse, W.H. & Anglin, D.L., Automotive Emission Control (2nd ed.). Highstown, NJ: McGraw-Hill, 1977.

(3) Crouse, W.H. & Anglin, D.L., Automotive Engines (5th ed.). Highstown, NJ: McGraw-Hill, 1976.

(4) Crouse, W.H. & Anglin, D.L., Automotive Fuel, Lubricating and Cooling Systems (5th ed.). Highstown, NJ: McGraw-Hill, 1976.

(5) Crouse, W.H. & Anglin, D.L., Automotive Tools, Fasteners and Measurements. Highstown, NJ: McGraw-Hill, 1977.

(6) Crouse, W.H. & Anglin, D.L., Automotive Transmissions and Power Trains (5th ed.). Highstown, NJ: McGraw-Hill, 1976.

(7) Crouse, W.H. & Anglin, D.L., Automotive Tune-up. Highstown, NJ: McGraw-Hill, 1977.

(8) Crouse, W.H. & Anglin, D.L., Motor Vehicle Inspection. Highstown, NJ: McGraw-Hill, 1978.

(9) Crouse, W.H. & Anglin, D.L., Pocket Automotive Dictionary. Highstown, NJ: McGraw-Hill, 1977.

(10) Crouse, W.H. & Anglin, D.L., Automotive Air Conditioning. Highstown, NJ: McGraw-Hill, 1977.

(1) Dwiggins, B.H., Automotive Air Conditioning (4th ed.). Albany, NY: Delmar, 1978.

(2) Dwiggins, B.H., Automotive Steering Systems. Albany, NY: Delmar.

Ellinger, H.E., Automotive Electrical Systems. Reston, VA: Prentice-Hall, 1976.

General Motors Corporation, Aids to Educators from General Motors. Detroit: Author, 1966. (ERIC Document Reproduction Service No. ED 022 971)

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Glenn, H.T., Auto Mechanics. Peoria, IL: Bennett.

Hughes, J.G., Guide to the Automobile Mechanic Certification Examination. Reston, VA: Prentice-Hall, 1978.

Jensen, L.E. & Brazier, W.A., Related Science-Automotive Trades. Albany, NY: Delmar.

Johnson, J.A., Automotive Diagnosis and Tune-up (2nd ed.). Highstown, NY: McGraw-Hill, 1977.

Mitchell Manuals, Inc., Repair Manual. San Diego, CA: Author, 1981.

Notgrass, T., Automotive Air Conditioning Mechanic-Students Manual. University of Texas at Austin: 1974.

Ohio State, Shop Safety. Columbus, OH: Trade and Industrial Education, Author.

Olivio, T.C., Practical Problems in Mathematics for Specific Trades. Albany, NY: Delmar.

(1) Remling, J., Basics. New York: Wiley, 1981.

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(1) Stockel, M.W., Auto Mechanics Fundamentals. South Holland, IL: Goodheart-Willcox, 1974.

(2) Stockel, M.W., Auto Service and Repair. South Holland, IL: Goodheart-Willcox, 1974.

Stovett. How to Read, Use and Care for Micrometers and Vernier Gages. Athol, MA.

Sun Electric Corp., Ignition Analyzer Handbook. Chicago: Author.

Toboldt, W.K. & Johnson, L., Automotive Encyclopedia. South Holland, IL: Goodheart-Willcox, 1979.

Weathers, T., Jr. & Hunter, C., Diesel Engines for Automobiles and Small Trucks. Reston, VA: Prentice-Hall, 1981.

Wetzel, G.F., Automotive Diagnosis and Tune-up (6th ed.). Bloomington, IL: McKnight.

Wilton & Rogers, Shop Mathematics at Work. Silver-Burdett Publishing Co.

AUDIO VISUALS AND STUDENT MATERIALS

Addresses for audio visuals and student materials, referenced in the unit guide sheets and listed on the Instructional Resource Matrix, are listed in the Additional Resources section. Materials developed by the State of Georgia are available from the Vocational Education Materials Center, University of Georgia.

ADDITIONAL INSTRUCTIONAL RESOURCES

In addition to the following instructional resources, a listing of catalogs, charts, free materials, audio visuals, demonstrations, etc. has been compiled by the Motor Vehicle Manufacturers Association (MVMA) and the Automotive Service Industry Association (ASIA).

The MVMA has published the booklet Standards for Vocational Automotive Service Instruction which consists of information invaluable to the instructor and/or vocational supervisor. The booklet provides information relating to advisory committees, curriculum, teacher requirements and recruitment, facilities, tool and equipment lists, student recruitment, classroom and shop management and co-op programs, addresses of motor vehicle related associations, instructional material resources and job descriptions.

The Auto Mechanics instructor is encouraged to write and request Standards for Vocational Automotive Service Instruction from:

Motor Vehicle Manufacturers Association
of the United States, Inc. (MVMA)
300 New Center Building
Detroit, MI 48202

Also, the Southern Association of Colleges and Schools is currently developing standards, evaluative material and procedures to be used in the certification of automotive mechanic training programs. Included are task lists, employability requirements, program standards, evaluative materials and procedures to be used for program improvement and certification.

For an update on the Automobile Mechanic Training Evaluation Project (AMTEP) write:

Commission on Occupational Education Institutions
Southern Association of Colleges and Schools
795 Peachtree Street, N.E.
Atlanta, GA 30365

ADDITIONAL INSTRUCTIONAL RESOURCES

Item: Manufacturer's Educational Materials

Resource	Product	Description
American Motors Corporation 14250 Plymouth Road Detroit, MI 48232	Automobiles	Training aids, shop manuals and special tools
Chrysler Corporation P. O. Box 1919 Detroit, MI 48232	Automobiles (Chrysler, Dodge, Plymouth)	Training aids, shop manuals and special tools
Ford Motor Company The American Road Dearborn, MI 48231	Automobiles (Ford, Lincoln-Mercury)	Training aids, shop manuals and special tools
General Motors Corporation 2860 Clark Avenue Detroit, MI 48232	Automobiles (Buick, Cadillac, Chevrolet, Oldsmobile, Pontiac)	Training aids, shop manuals and special tools

ADDITIONAL INSTRUCTIONAL RESOURCES

Item: Publishers of Textbooks and Audio Visuals

Resource	Product	Description
AAVIM 120 Engineering Center Athens, GA 30602	Textbooks & audio visuals	Teacher and student materials with slides and transparencies
American Technical Publishers, Inc. 5608 Stony Island Avenue Chicago, IL 60637	Textbooks	Automotive repair
Automated Training, Inc. 1401 S. Mint Street Box 34707 Charlotte, NC 28234	Audio visuals	Film loops and filmstrips in automotive repair
Bergwall Productions, Inc. Garden City, NY 11530	Audio visuals	Filmstrips in automotive repair
Charles A. Bennett Co., Inc. 809 W. Detweiller Drive Peroia, IL 61615	Textbooks	Automotive and power mechanics
DCA Educational Productions 424 Valley Road Warrington, PA 18976	Audio visuals	Transparencies and film loops in automotive repair
Delmar Publishers 7625 Empire Drive Florence, KY 41042	Textbooks	Math and science textbooks for trades
Ford Service Publications P. O. Box 07150 Detroit, MI 48207	Audio visuals	Slide sets, filmstrips, flip charts, student materials, etc. for auto mechanics
Goodheart-Willcox Company 123 W. Tart Drive South Holland, IL 60473	Textbooks	Automotive repair

Resource	Product	Description
Hobar Publications 1234 Tiller Lane St. Paul, MN 55112	Catalog of instructional materials	A compilation of different manufacturers of audio visuals, texts, tools, etc. for automotive repair
Howard W. Sams & Company, Inc. 4300 West 62nd Street Indianapolis, IN 46206	Textbooks & service manuals	Automotive repair
John Wiley & Sons 605 3rd Avenue New York, NY 10158	Textbooks	Automechanics
MAVCC 1515 W. Sixth Avenue Stillwater, OK 74074	Student materials	Units in automotive brake systems
McGraw-Hill P. O. Box 996 Norcross, GA 30091	Textbooks	Large selection of automotive materials
McKnight Publishing Company Bloomington, IL 61701	Textbooks	Automotive and power mechanics
Okalhoma State Department of Vocational-Technical Education Curriculum & Instructional Materials Center 1515 W. Sixth Avenue Stillwater, OK 74074	Student materials	2 Volume comprehensive automotive mechanics program with teacher guides
Prentice-Hall Media ServCode XF 150 White Plains Road Tarrytown, NY 10591	Textbooks & audio visuals	Automotive (gas & diesel)
School Media Associates 2620 Caladium Drive, N.E. Atlanta, GA 30345	Audio visuals	A compilation of various manufacturers of slides, filmstrips, transparencies and student materials in the automotive and diesel areas

Resource	Product	Description
University of Missouri- Columbia 10 Industrial Education Bldg. Columbia, MO 65211	Catalog of instructional materials	A compilation of materials available from universities and manufacturers for automotive and small engine mechanics
Wisconsin Vocational Studies Center University of Wisconsin-Madison 964 Educational Sciences Bldg. 1025 W. Johnson Street Madison, WI 53706	Bibliography of resource materials	A bibliography of materials available in trade and industrial education

ADDITIONAL INSTRUCTIONAL RESOURCES

Item: Comprehensive Repair Manuals

Resource	Product	Description
Clymer Publications 12860 Muscatine Street P. O. Box 20 Arelta, CA 91331	Automotive repair manuals	Repair manual for specific automobile models
Chilton Book Company Chilton Way Radnor, PA 19089	Chilton's Automotive Service Manual	Repair manual, published yearly for domestic & foreign cars; Also publish flat rate manuals
Mitchell Manuals, Inc. P. O. Box 80427 San Diego, CA 92138	Mitchell	Repair manual, published yearly for domestic & foreign cars including diesel
Motor 1970 Broadway New York, NY	Motor Auto Repair Manual	Repair manual published yearly for domestic & foreign cars; Also publish flat rate manuals & truck repair manuals
Regnery Publishing Company 114 West Illinois Street Chicago, IL 60610	Automotive repair manuals	Repair manuals for specific automobile models

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ADDITIONAL INSTRUCTIONAL RESOURCES

Item: Tools and Equipment

Resource	Product	Description
Albertson & Company, Inc. Sioux City, IA 51102	Automotive tools	Special tools & equipment for engine repair
Alemite Division Stewart-Warner Corp. 1826 W. Diversey Parkway Chicago, IL 60614	Lubrication equipment	Grease guns, pumps, etc.
Allen Electric & Equipment Co. 2101 N. Pitcher Street Kalamazoo, MI 49002	Electrical test equipment	Charging system testers, etc.
Ammco Tools, Inc. 2100 Commonwealth Avenue North Chicago, IL 60064	Brake service tools and equipment, engine tools	Disc & drum lathes, hones, special wrenches, etc.
Auto Specialties Manufacturing Company St. Joseph, MI 49085	Automotive lifting equipment	Lifts, jacks, stands, etc.
Auto-Test, Inc. 411 West 8th Street Neillsville, WI 54456	Test equipment	Engine test equipment, etc.
Balcrank Products Wheelabrator-Frye, Inc. 400 South Byrkit Avenue Mishawaks, IN 46544	Lubrication equipment	Grease guns, pumps, etc.
John Bean Division FMC Corporation Lansing, Michigan 48900	Front end equipment	Alignment racks, tire balancing equipment
Bear Manufacturing Corporation 2830 Fifth Street Rock Island, IL 61201	Front end equipment	Alignment racks, tire balancing equipment
Black & Decker Manufacturing Company Towson, MD 21204	Air & electric tools and equipment	Air wrenches, electric drills, etc. valve grinding equipment
Blackhawk Manufacturing Co. Applied Power Industries, Inc. Box 8720 Milwaukee, WI 53227	Tools	Jacks, stands, hand tools

Resource	Product	Description
Coats Company, Inc. 1601 J. P. Hennessy Drive La Vergne, TN 37086	Tire tools	Tire changing equipment, balancers, etc.
E. Edelmann & Company Chicago, IL 60647	Tools	Line flaring tools and fittings
Fox Valley Instrument Co. Sheboygan, MI 49721	Test equipment	Timing lights, meters, etc.
Graham Research, Inc. Minneapolis, MN 55418	Electrical test equipment	Coil testers, etc.
Herbrand, Kelsey Hayes Tool Division Orangeburg, SC 29115	Hand tools	Wrenches, hammers, etc.
Hunter Engineering Co. 1350 Hunter Drive Bridgton, MS 63044	Front end equipment	Alignment racks, tire balancing equipment
Ingersol Rand/Proto Tool Co. 2309 Santa Fe Avenue Los Angeles, CA 90058	Hand & power tools	Air wrenches, hand tool sets, etc.
Kal-Equip Company 411 Washington Street Otsego, MI 49078	Test equipment	Electrical test meters, etc.
K-D Manufacturing Company Hempland Road Lancaster, PA 17604	Special tools	Automotive tools & repair equipment
Mac Tools, Inc. Washington Court House, OH 43160	Hand tools & automotive repair equipment	Wrenches, sockets, test equipment, etc.
Marquette Corporation 307 East Hennepin Avenue Minneapolis, MN 55414	Test equipment	Battery chargers, testers, etc.
Milwaukee Hydraulic Products Corporation Milwaukee, WI 53214	Automotive lifting equipment	Hydraulic presses, jacks, stands, etc.
Morris Tools 724 Penryn Road Manheim, PA 17545	Tools	Specialty tools & equipment for automotive repair

Resource	Product	Description
Neway Sales, Inc. Corunna, MI 48817	Valve tools	Valve seat cutter, valve tools
Owatonna Tool Company P. O. Box 268 Owatonna, MN 55060	Special tools, pullers	Bearing & gear pullers, etc.
P & C Hand Tool Company P. O. Box 22066 Portland, OR 93222	Hand tools	Wrenches, sockets, etc.
Proto Tool Division Ingersol Rand Corporation 3900 Wesley Terrace Schiller Park, IL 60176	Hand tools	Wrenches, sockets, etc.
Rockwell International Power Tool Division 6263 Poplar Avenue Memphis, TN 37901	Air & electric tools	Air wrenches, electric drills, etc.
S. K. Wayne Tool Company Chicago, IL 60604	Hand tools	Wrenches, sockets, etc.
Sioux, Inc. 2901 Floyd Boulevard Sioux City, IA 51102	Valve grinding equipment	Valve grinders, seat grinders, etc.
Snap-On Tools Corporation 8028 28th Avenue Kenosha, WI 53140	Hand tools & automotive repair equipment	Wrenches, sockets, test equipment, etc.
Stewart-Warner Corporation Alemite & Instrument Division 1826 Diversey Parkway Chicago, IL 60614	Front end equipment	Alignment racks, tire balancing, lubrication equipment, etc.
Sun Electric Corporation Harlem & Avondale Chicago, IL 60631	Test equipment	Ignition & exhaust analyzer, electric systems test equipment
Sunnen Products Company St. Louis, MO 63143	Engine repair tools	Cylinder hones, ridge reamers, etc.
Walker Manufacturing Company 1201 Michigan Boulevard Racine, WI 53402	Automotive lifting equipment	Lifts, jacks, stands, etc.
Weaver Division Dura Corp. 2171 South 9th Street Springfield, IL 62705	Automotive lifting equipment	Jacks, car stands, etc.

ADDITIONAL INSTRUCTIONAL RESOURCES

Item: Parts and Accessory Manufacturers (other than OEM)

Resource	Product	Description
AC-Delco Division General Motors Corp. 400 Renaissance Center Detroit, MI 48243	Automotive parts and accessories	Batteries, spark plugs, fuel pumps, alternators, etc.
Airesearch P. O. Box 92930 Los Angeles, CA 90009	Automotive diesel accessories	Diesel turbochargers
American Bosch 3664 Main Street Springfield, MA 01107	Automotive diesel parts	Injection pumps & injectors
Arvin Industries, Inc. Automotive Aftermarket Division Columbus, IN 47201	Automotive parts and accessories	Exhaust system components
Auto-lite Division Ford Motor Company 1122 Millidge Drive East Point, GA 30344	Automotive parts and accessories	Batteries, spark plugs, fuel pumps, alternators, etc.
Bendix Automotive 1217 S. Walnut Street South Bend, IN 46620	Automotive parts	Tune-up and brake parts
Carter Carburetor Division ACF Industries, Inc. Educational Aids Department P. O. Box 16092 Clayton, MO 63105	Automotive parts and accessories	Fuel system components
Champion Spark Plug Company P. O. Box 910 Toledo, OH 43601	Automotive parts	Spark plugs
Chicago Rawhide Manufacturing Company 900 N. State Street Elgin, IL 60120	Automotive parts	Grease and oil seals
CRC Chemicals Division of C. J. Webb, Inc. Limekiln Pike P. O. Box 100 Dresher, PA 19025	Lubricants	Lubricants, penetrants, cleaners

Resource	Product	Description
Dana Parts Corporation P. O. Box 500 Hagerstown, IN 47346	Automotive parts	Transmission, rear end parts & engine parts
Echlin Manufacturing Company Branford, CT 06405	Automotive parts and accessories	Electrical system components
E. Edelmann & Company Chicago, IL 60647	Automotive parts	Brake lines, tubings, fittings, etc.
EIS Corporation Middlefield, CT 06455	Automotive parts	Brake system components
Fel-Pro Incorporated Skokie, IL 60076	Automotive gaskets	Gaskets and sealers
Fram Providence, RI 02916	Automotive parts	Fuel, air and oil filters
Gabriel Division Maremount Corporation 1283 Murfreesboro Road Nashville, TN 37217	Automotive parts	Shock absorbers
The Gates Rubber Company 999 South Broadway Denver, CO 80217	Automotive parts	Belts and hoses
Gould Engine Parts Division St. Paul, MN 55101	Automotive parts	Pistons, rings, valves, etc.
The Goodyear Tire & Rubber Co. Akron, OH 44309	Automotive parts	Tires, hoses, belts
Grey-Rock Division Raybestos Manhattan, Inc. P. O. Box 9140 Bridgeport, CT 06603	Automotive parts	Brake lining
Harrison Radiator Division General Motors Corporation Lockport, NY 14094	Automotive parts	Radiators, heaters and air conditioners
Hastings Manufacturing Company Hastings, MI 49058	Automotive parts	Engine rebuild parts
Holset Division of Lucas P. O. Box 24030 Jacksonville, FL 32217	Automotive accessories	Diesel turbochargers

Resource	Product	Description
Kelsey Products Division Kelsey-Hays Company 38481 Huron River Drive Romulus, MI 48174	Automotive parts	Brake system components
Kem Manufacturing Company, Inc. Fair Lawn, NJ 07410	Automotive parts	Filters, fuel pumps, ignition parts
Lockhead Products Wagner Electric Corporation 6400 Plymouth Avenue St. Louis, MO 63100	Automotive parts	Brake system components
McQuary-Norris Manufacturing Company St. Louis, MO 61300	Automotive parts	Pistons, rings, valves, etc.
Moog Industries Box 7224 St. Louis, MO 63177	Automotive parts	Steering and suspension system components
Motorola, Inc. 1299 E. Algonquin Road Schaumburg, IL 60196	Automotive electrical system parts & accessories	Electronic ignition parts, alternators, etc.
NAPA Distribution Center P. O. Box 2000 Norcross, GA 30091	Automotive parts and accessories	Parts and components for automotive systems
C. E. Niehoff & Company 4925 Lawrenceville Avenue Chicago, IL 60630	Automotive parts	Ignition and electrical system parts
Pennzoil Oil City, PA 16301	Lubricants	Oil and grease
Prestolite P. O. Box 963 300 City Park Avenue Toledo, OH 43601	Automotive parts	Electrical system components
Quaker State Oil Refining Corp. Oil City, PA 16301	Lubricants	Oil and grease
Raybestos Division Raybestos Manhattan, Inc. Bridgeport, CT 06603	Automotive brake parts	Brake lining

Resource	Product	Description
Robertshaw Controls Company P. O. Box 400 2318 Kingston Pike Knoxville, TN 37901	Automotive parts	Fuel caps, radiator caps, etc.
Shell Film Library 1433 Sadlier Circle W. Drive Indianapolis, IN 46239	Lubricants	Training films available
Standard Motor Products, Inc. 37-18 Northern Boulevard Long Island City, NY 11101	Automotive parts and accessories	Tune-up parts
Standard-Thomson Copr. 152 Grove Street Waltham, MA 02154	Automotive cooling system parts	Radiator caps, thermostats, etc.
Stant Manufacturing Co., Inc. Connersville, IN 47331	Automotive cooling system parts	Radiator caps, thermostats, etc.
TRW, Inc. Replacement Division 8001 E. Pleasant Valley Road Cleveland, OH 44131	Automotive parts	Parts and components for all systems
Union Carbide Corp. 270 Park Avenue New York, NY 10017	Chemicals	Antifreeze, etc.
Valvoline Oil Company Division of Ashland Oil Co. Ashland, KY 41101	Lubricants	Oil and grease

SECTION VII

STUDENT RECORDS

STUDENT RECORDS

This section contains four forms, the Individual Progress Report Chart, the Group Progress Chart, the Competency Checklist and the Certificate of Competency. The use of these Charts is described below and on page 6.

INDIVIDUAL PROGRESS REPORT

One copy should be kept in each student's confidential file and updated as tasks are completed. Grades should be assigned upon task completion and then averaged for grade reporting. Difficulty, excessive amounts of time, etc. should be noted on this form and should be discussed with the student.

GROUP PROGRESS CHART

This chart reflects task completion only and can be displayed in the classroom or lab area. Due to confidentiality of records, a grade must not be recorded. The instructor should maintain a copy of this record and update it daily.

INDIVIDUAL PROGRESS REPORT

NAME ____________________

PROGRAM/ CLUSTER ____________________ AREA ____________________

TASK/ UNIT NO.	UNIT TITLE	DATE STARTED	DATE COMP.	EST. TIME	GRADE

GROUP PROGRESS CHART

NAME	UNITS/TASKS																				

COMPETENCY CHECKLIST

The Competency Checklist is an easy device for the instructor to use to know when a student is eligible to receive a Certificate of Competency. One Checklist is used per student for as long as the student stays in the program. The instructor may use the checklist in the following manner:

1. Enter the student's name on the form.
2. As the student masters each task, check-off the task under each job title on the Competency Checklist for which it appears.
3. Keep the Checklist in each student's personal file or keep all Competency Checklists together in a separate file.
4. When all the tasks underneath a job title have been checked-off, the student is eligible to receive a Certificate of Competency for that job title.

CERTIFICATE OF COMPETENCY

The Certificate of Competency is issued by the instructor to certify that the student has mastered the tasks necessary for entry level employment for the job listed on the Certificate. The specific tasks that have been mastered are printed on the back of the Certificate, which can be used by the student to show a prospective employer exactly what the student is qualified to do. The Certificates should be printed ahead of time so that the instructor may simply fill in the front of the Certificate whenever a student is eligible to receive one, as indicated by the student's Competency Checklist. A Certificate of Competency for each of the possible exit points (job titles) is included in this section.

The Certificate should be completed by the instructor as follows:

1. Enter the student's name.
2. Enter the school name.
3. Date and sign the Certificate.
4. It is recommended that the Certificate be stamped with the school seal.

COMPETENCY CHECKLIST

____
STUDENT NAME

As the student masters each unit of instruction, check off the unit number under each of the following job titles where it appears. When all the units under a job title have been completed, the student is eligible to receive a Certificate of Competency for that job title.

Automobile Service Station Attendant
915.467-010

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Auto Mechanic Helper
620.684-014

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Brake Mechanic
620.281-026

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Front End Mechanic
620.281-038

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Carburetor Mechanic
620.281-034

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Tune-up Mechanic
620.281-066

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Transmission Mechanic
620.281-062

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Diesel Mechanic Helper
625.684-010

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Auto Mechanic
620.261-010

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CERTIFICATE OF COMPETENCY

This is to Certify that

Robert A. Jones

of

SAMPLE

Athens Area Vo-Tech School

has successfully mastered the competencies required to perform the job of BRAKE MECHANIC.

Ed Milan

June 10, 1981

The student named on this certificate has demonstrated mastery of the following tasks required to perform the job of Brake Mechanic.

Brake Mechanic
(D.O.T. 620.281-026)

Automotive Service Checks
Lubricating chassis & components
Replacing light bulbs & fuses
Performing state inspection

Automotive Starting System
Servicing battery & cables

Automotive Braking System
Identifying brake system components
Adjusting brakes
Removing & rebuilding brake cylinders
Removing & rebuilding brake calipers
Replacing brake shoes & pads
Machining brake drums
Machining brake rotors
Replacing hydraulic control valves & lines
Replacing power brake units
Diagnosing brake system problems

Automotive Suspension System
Identifying suspension system components
Inspecting suspension system components
Lubricating & adjusting front wheel bearings
Replacing shock absorbers

Automotive Steering System
Identifying steering system components
Adjusting manual steering gear
Diagnosing steering system problems

Automotive Electrical Circuits
Repairing brake light circuit

CERTIFICATE OF COMPETENCY

This is to Certify that

____

of

____

has successfully mastered the competencies required to perform the job of DIESEL MECHANIC HELPER.

____

____

The student named on this certificate has demonstrated mastery of the following tasks required to perform the job of Diesel Mechanic Helper.

DIESEL MECHANIC HELPER
(D.O.T. 625.684-010)

Automotive Service Checks
- Checking & changing engine oil & oil filter
- Checking fluid level & refilling transmission & rear end
- Lubricating chassis & components
- Checking & replacing windshield wiper blades
- Repairing tires & tubes
- Replacing light bulbs & fuses
- Washing & waxing vehicle
- Performing state inspection

Automotive Fuel System
- Cleaning or replacing fuel & air filters

Automotive Starting System
- Servicing battery & cables
- Removing & replacing the starter
- Disassembling & inspecting the starter components
- Reconditioning the starter components

Automotive Charging System
- Removing & replacing generators & alternators

Automotive Heating & Cooling System
- Checking coolant level & freezing point
- Cleaning & flushing the system
- Inspecting, adjusting or replacing fan belts & hoses
- Testing system with pressure
- Removing, repairing & replacing the radiator
- Testing & replacing thermostats & radiator caps
- Replacing the variable speed fan
- Replacing the water pump

Automotive Braking System
- Identifying brake system components
- Adjusting brakes
- Removing & rebuilding brake cylinders
- Replacing brake shoes & pads

Automotive Suspension System
- Identifying suspension system components
- Inspecting suspension system components
- Lubricating & adjusting front wheel bearings
- Replacing shock absorbers
- Changing & balancing wheels & tires
- Replacing upper & lower control arms & bushings
- Replacing upper & lower ball joints
- Replacing king pins & bushings

Automotive Steering System
- Identifying steering system components
- Replacing power steering unit

Automotive Emissions Control and Exhaust Systems
- Identifying emission control components
- Removing & replacing exhaust pipes, mufflers & tail pipes

Automotive Valve Job
- Identifying component parts
- Performing the cylinder compression & leakage test
- Adjusting the valves
- Removing the cylinder head(s)
- Removing & inspecting the valves & component parts

Automotive Timing Chain Replacement
- Removing component parts
- Diagnosing timing chain problems

Automotive Short Block
- Removing engine from vehicle
- Removing & inspecting useable parts
- Disassembling engine
- Cleaning & inspecting block & components
- Preparing cylinder block
- Installing cam bearings
- Installing piston pins & rings
- Installing crankshaft
- Installing pistons & rod bearings

Automotive Diesel Engine Overhaul
- Comparing the automotive gas & diesel engines
- Performing the cylinder compression leakage test
- Removing & replacing fuel injectors
- Removing & replacing the fuel injection pump
- Removing & replacing the turbocharger
- Removing the engine from the vehicle
- Disassembling & inspecting the engine
- Rebuilding the diesel engine
- Installing the engine

CERTIFICATE OF COMPETENCY

This is to Certify that

____

of

____

has successfully mastered the competencies required to perform the job of AUTOMOBILE SERVICE STATION ATTENDANT.

____

____

The student named on this certificate has demonstrated mastery of the following tasks required to perform the job of Automobile Service Station Attendant.

Automobile Service Station Attendant
(D.O.T. 915.467-010)

Automotive Service Checks

Checking & changing engine oil & oil filter
Checking fluid level & refilling transmission & rear end
Lubricating chassis & components
Checking & replacing windshield wiper blades
Repairing tires & tubes
Replacing light bulbs & fuses
Washing & waxing vehicle
Performing state inspection

Automotive Fuel System

Adjusting fuel/air mixtures & mechanical linkage
Cleaning or replacing fuel & air filters

Automotive Ignition System

Inspecting, selecting & installing spark plugs

Automotive Starting System

Servicing battery & cables
Removing & replacing the starter

Automotive Charging System

Removing & replacing generators & alternators

Automotive Heating and Cooling System

Checking coolant level & freezing point
Cleaning & flushing the system
Inspectng, adjusting or replacing fan belts & hoses
Testing system with pressure
Removing, repairing & replacing the radiator
Testing & replacing thermostats & radiator caps
Replacing the variable speed fan
Replacing the water pump

Automotive Braking System

Identifying brake system components
Adjusting brakes

Automotive Suspension System

Identifying suspension system components
Inspecting suspension system components
Lubricating & adjusting front wheel bearings
Replacing shock absorbers
Changing & balancing wheels & tires

Automotive Steering System

Identifying steering system components

Automotive Emissions Control and Exhaust Systems

Identifying emission control components
Testing & replacing components in the positive crankcase ventilation (PCV) system
Testing & replacing components in the fuel evaporative control system
Testing & replacing components in the exhaust gas recirculation (EGR) system
Testing & replacing the catalytic converter
Testing & replacing components in the thermostatic air cleaner system
Testing & replacing components in the air injection reaction (AIR) system
Testing & replacing components in the spark control system
Removing & replacing exhaust pipes, mufflers & tail pipes
Diagnosing emission control & exhaust system problems

CERTIFICATE OF COMPETENCY

This is to Certify that

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of

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has successfully mastered the competencies required to perform the job of TRANSMISSION MECHANIC.

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The student named on this certificate has demonstrated mastery of the following tasks required to perform the job of Transmission Mechanic.

TRANSMISSION MECHANIC
(D.O.T. 620.281-062)

Automotive Service Checks
Checking fluid level & refilling transmission & rear end
Lubricating chassis & components
Performing state inspection

Automotive Fuel System
Adjusting fuel/air mixtures & mechanical linkage
Cleaning or replacing fuel & air filters

Automotive Starting System
Removing & replacing the starter

Automotive Heating & Cooling System
Inspecting, adjusting or replacing fan belts & hoses
Removing, repairing & replacing the radiator
Testing & replacing thermostats & radiator caps
Replacing the variable speed fan

Automotive Braking System
Diagnosing brake system problems

Automotive Manual Transmission
Adjusting and repairing clutch & shift linkage
Removing and disassembling transmission
Inspecting and reassembling transmission
Removing and replacing clutch assembly
Removing and replacing flywheel ring gear
Diagnosing manual transmission problems

Automotive Drive Line and Rear End
Inspecting drive shaft
Removing and replacing universal joint
Removing and replacing constant velocity joints

Automotive Automatic Transmissions
Testing the automatic transmission
Inspecting and adjusting shift linkage
Removing and disassembling transmission
Inspecting and reassembling transmission
Testing transmission on bench
Removing and replacing torque converter
Diagnosing automatic transmission

CERTIFICATE OF COMPETENCY

This is to Certify that

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of

____

has successfully mastered the competencies required to perform the job of ____________CARBURETOR MECHANIC____________.

____

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The student named on this certificate has demonstrated mastery of the following tasks required to perform the job of Carburetor Mechanic.

Carburetor Mechanic
(D.O.T. 620.281-034)

Automotive Service Checks

- Lubricating chassis & components
- Replacing light bulbs & fuses
- Performing state inspection

Automotive Fuel System

- Adjusting fuel/air mixtures & mechanical linkage
- Cleaning or replacing fuel & air filters
- Removing carburetor from engine
- Disassembling, cleaning & inspecting carburetor
- Reassembling & testing carburetor
- Testing & replacing fuel pump
- Servicing fuel tank, lines, hoses & fuel level monitoring devices
- Diagnosing fuel system problems

Automotive Ignition System

- Inspecting, selecting & installing spark plugs
- Timing the ignition
- Inspecting & replacing circuit wiring, distributor cap & rotor
- Testing, removing & replacing battery ignition components
- Testing, removing & replacing electronic ignition components
- Using & interpreting the ignition analyzer
- Diagnosing ignition system problems

Automotive Charging System

- Removing & replacing generators & alternators

Automotive Heating and Cooling System

- Checking coolant level & freezing point
- Inspecting, adjusting or replacing fan belts & hoses
- Diagnosing engine heating & cooling system problems

Automotive Emissions Control and Exhaust Systems

- Identifying emission control components
- Measuring exhaust emissions
- Testing & replacing components in the positive crankcase ventilation (PCV) system
- Testing & replacing components in the fuel evaporative control system
- Testing & replacing components in the exhaust gas recirculation (EGR) system
- Testing & replacing components in the thermostatic air cleaner system
- Testing & replacing components in the air injection reaction (AIR) system
- Testing & replacing components in the spark control system
- Removing & replacing exhaust pipes, mufflers & tail pipes
- Diagnosing emission control & exhaust system problems

Automotive Valve Job

- Identifying component parts
- Performing the cylinder compression & leakage test
- Adjusting the valves

Automotive Timing Chain Replacement

- Diagnosing timing chain problems

Automotive Diesel Engine Overhaul

- Comparing the automotive gas & diesel engines

CERTIFICATE OF COMPETENCY

This is to Certify that

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of

____

has successfully mastered the competencies required to perform the job of ______ BRAKE MECHANIC ______.

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The student named on this certificate has demonstrated mastery of the following tasks required to perform the job of Brake Mechanic.

Brake Mechanic
(D.O.T. 620.281-026)

Automotive Service Checks
Lubricating chassis & components
Replacing light bulbs & fuses
Performing state inspection

Automotive Starting System
Servicing battery & cables

Automotive Braking System
Identifying brake system components
Adjusting brakes
Removing & rebuilding brake cylinders
Removing & rebuilding brake calipers
Replacing brake shoes & pads
Machining brake drums
Machining brake rotors
Replacing hydraulic control valves & lines
Replacing power brake units
Diagnosing brake system problems

Automotive Suspension System
Identifying suspension system components
Inspecting suspension system components
Lubricating & adjusting front wheel bearings
Replacing shock absorbers

Automotive Steering System
Identifying steering system components
Adjusting manual steering gear
Diagnosing steering system problems

Automotive Electrical Circuits
Repairing brake light circuit

CERTIFICATE OF COMPETENCY

This is to Certify that

of

has successfully mastered the competencies required to perform the job of FRONT END MECHANIC.

The student named on this certificate has demonstrated mastery of the following tasks required to perform the job of Front End Mechanic.

Front End Mechanic.
(D.O.T. 620.281-038)

Automotive Service Checks
- Lubricating chassis & components
- Repairing tires & tubes
- Replacing light bulbs & fuses
- Performing state inspection

Automotive Charging System
- Removing & replacing generators

Automotive Braking System
- Identifying brake system components
- Adjusting brakes
- Removing & rebuilding brake cylinders
- Removing & rebuilding brake calipers
- Replacing brake shoes & pads
- Diagnosing brake system problems

Automotive Suspension System
- Identifying suspension system components
- Inspecting suspension system components
- Lubricating & adjusting front wheel bearings
- Replacing shock absorbers
- Replacing front coil springs & rear leaf springs
- Changing & balancing wheels & tires
- Replacing upper & lower control arms & bushings
- Replacing upper & lower ball joints
- Replacing king pins & bushings
- Replacing torsion bars
- Replacing twin I-beams
- Diagnosing suspension system problems

Automotive Steering System
- Identifying steering system components
- Adjusting manual steering gear
- Inspecting & replacing steering gear linkage
- Replacing power steering unit
- Replacing steering column
- Aligning the front-end
- Diagnosing steering system problems

CERTIFICATE OF COMPETENCY

This is to Certify that

____

of

____

has successfully mastered the competencies required to perform the job of AUTO MECHANIC HELPER.

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____

The student named on this certificate has demonstrated mastery of the following tasks required to perform the job of Auto Mechanic Helper.

AUTO MECHANIC HELPER
(D.O.T. 620.684-014)

Automotive Service Checks
- Checking & changing engine oil & oil filter
- Checking fluid level & refilling transmission & rear end
- Lubricating chassis & components
- Checking & replacing windshield wiper blades
- Repairing tires & tubes
- Replacing light bulbs & fuses
- Washing & waxing vehicle
- Performing state inspection

Automotive Fuel System
- Adjusting fuel/air mixtures & mechanical linkage
- Cleaning or replacing fuel & air filters
- Removing carburetor from engine

Automotive Ignition System
- Inspecting, selecting & installing spark plugs
- Timing the ignition
- Inspecting & replacing circuit wiring, distributor cap & rotor
- Testing, removing & replacing battery ignition components

Automotive Starting System
- Servicing battery & cables
- Removing & replacing the starter

Automotive Heating and Cooling System
- Checking coolant level & freezing point
- Cleaning & flushing the system
- Inspecting, adjusting or replacing fan belts & hoses
- Testing system with pressure
- Removing, repairing & replacing the radiator
- Testing & replacing thermostats & radiator caps
- Replacing the variable speed fan
- Replacing the water pump

Automotive Braking System
- Identifying brake system components
- Adjusting brakes
- Removing & rebuilding brake cylinders
- Replacing brake shoes & pads
- Machining brake drums
- Machining brake rotors
- Replacing hydraulic control valves & lines
- Replacing power brake units

Automotive Suspension System
- Identifying suspension system components
- Inspecting suspension system components
- Lubricating & adjusting front wheel bearings
- Replacing shock absorbers
- Replacing front coil springs & rear leaf springs
- Changing & balancing wheels & tires
- Replacing upper & lower control arms & bushings
- Replacing upper & lower ball joints
- Replacing king pins and bushings

Automotive Steering System
- Identifying steering system components
- Replacing power steering unit

Automotive Emissions Control and Exhaust Systems
- Identifying emission control components
- Testing & replacing components in the positive crankcase ventilation (PCV) system

Automotive Valve Job
- Identifying component parts
- Performing the cylinder compression and leakage test
- Adjusting the valves
- Removing the cylinder head(s)
- Removing & inspecting the valves & component parts
- Refacing the valves & valve stems
- Inspecting the cylinder head
- Grinding the valve sets
- Servicing the rocker arm, push rod & lifter assemblies
- Reassembling & replacing the cylinder head (s)

Automotive Timing Chain Replacement
- Removing component parts
- Removing vibration damper
- Removing front cover
- Removing & replacing timing chain (s) and/or gears
- Replacing front cover & seal
- Diagnosing timing chain problems

Automotive Short Block
- Removing engine from vehicle
- Removing & inspecting useable parts
- Assembling new & used parts on block assembly
- Installing engine assembly
- Disassembling engine
- Cleaning & inspecting block & components
- Preparing cylinder block
- Installing cam bearings
- Installing piston pins & rings
- Installing crankshaft
- Installing pistons & rod bearings

Automotive Diesel Engine Overhaul
- Comparing the automotive gas & diesel engines
- Performing the cylinder compression leakage test
- Removing & replacing fuel injectors
- Removing & replacing the fuel injection pump
- Removing & replacing the turbocharger
- Removing the engine from the vehicle
- Disassembling & inspecting the engine
- Rebuilding the diesel engine
- Installing the engine

Automotive Electrical Circuits
- Replacing wiring & making splices

Automotive Air Conditioning
- Discharging the system
- Replacing refrigerant lines & accessories

Automotive Manual Transmissions
- Adjusting & repairing clutch & linkage
- Removing & disassembling transmission
- Remove & replace clutch
- Remove & replace flywheel ring gear

Automotive Drive Line & Rear End
- Remove & replace universal joints
- Remove & replace rear axle bearings

Automotive Automatic Transmissions
- Remove & replace transmission oil filter

CERTIFICATE OF COMPETENCY

This is to Certify that

of

has successfully mastered the competencies required to perform the job of TUNE-UP MECHANIC.

The student named on this certificate has demonstrated mastery of the following tasks required to perform the job of Tune-up Mechanic.

TUNE-UP MECHANIC
(D.O.T. 620.281-066)

Automotive Service Checks
Lubricating chassis & components
Replacing light bulbs & fuses
Performing state inspection

Automotive Fuel System
Adjusting fuel/air mixtures & mechanical linkage
Cleaning or replacing fuel & air filters
Removing carburetor from engine
Disassembling, cleaning & inspecting carburetor
Reassembling & testing carburetor
Testing & replacing fuel pump
Servicing fuel tank, lines, hoses & fuel level monitoring devices
Diagnosing fuel system problems

Automotive Ignition System
Inspecting, selecting & installing spark plugs
Timing the ignition
Inspecting & replacing circuit wiring, distributor cap & rotor
Testing, removing & replacing electronic ignition components
Using & interpreting the ignition analyzer
Diagnosing ignition system problems

Automotive Starting System
Servicing battery & cables
Replacing & rebuilding solenoids & switches
Removing & replacing the starter
Disassembling & inspecting the starter components
Reconditioning the starter components
Reassembling & testing the starter
Diagnosing starting problems

Automotive Charging System
Testing the DC generator & regulator
Testing the alternator & regulator
Removing, disassembling & inspecting the generator
Rebuilding the generator
Removing, disassembling & inspecting the alternator
Rebuilding the alternator
Removing & replacing generators & alternators
Diagnosing charging system problems

Automotive Heating and Cooling System
Checking coolant level & freezing point
Cleaning & flushing the system
Inspecting, adjusting or replacing fan belts & hoses
Testing system with pressure
Removing, repairing & replacing the radiator
Testing & replacing thermostats & radiator caps
Replacing the variable speed fan
Replacing the water pump
Repairing the heater controls
Removing, repairing & replacing the heater core
Diagnosing engine heating & cooling system problems

Automotive Emissions Control and Exhaust Systems
Identifying emission control components
Measuring exhaust emissions
Testing & replacing components in the positive crankcase ventilation (PCV) system
Testing & replacing components in the fuel evaporative control system
Testing & replacing components in the exhaust gas recirculation (EGR) system
Testing & replacing the catalytic converter
Testing & replacing components in the thermostatic air cleaner system
Testing & replacing components in the air injection reaction (AIR) system
Testing & replacing components in the spark control system
Removing & replacing exhaust pipes, mufflers & tail pipes
Diagnosing emission control & exhaust system problems

Automotive Valve Job
Identifying component parts
Performing the cylinder compression & leakage test
Adjusting the valves

Automotive Timing Chain Replacement
Diagnosing timing chain problems

Automotive Diesel Engine Overhaul
Comparing the automotive gas & diesel engines

Automotive Electrical Circuits
Replacing wiring & making splices
Testing & maintaining electrical protection devices

Automotive Electrical Accessories
Testing & repairing the cruise control unit

CERTIFICATE OF COMPETENCY

This is to Certify that

of

has successfully mastered the competencies required to perform the job of AUTO MECHANIC.

The student named on this certificate has demonstrated mastery of the following tasks required to perform the job of Auto Mechanic.

AUTO MECHANIC
(D.O.T. 620.261-010)

Automotive Service Checks
Checking & changing engine oil & oil filter
Checking fluid level & refilling transmission & rear end
Lubricating chassis & components
Checking & replacing windshield wiper blades
Repairing tires & tubes
Replacing light bulbs & fuses
Washing & waxing vehicle
Performing state inspection

Automotive Fuel System
Adjusting fuel/air mixtures & mechanical linkage
Cleaning or replacing fuel & air filters
Removing carburetor from engine
Disassembling, cleaning & inspecting carburetor
Reassembling & testing carburetor
Testing & replacing fuel pump
Servicing fuel tank, lines, hoses & fuel level monotoring devices
Diagnosing fuel system problems

Automotive Ignition System
Inspecting, selecting & installing spark plugs
Timing the ignition
Inspecting & replacing circuit wiring, distributor cap & rotor
Testing, removing & replacing battery ignition components
Testing, removing & replacing electronic ignition components
Using & interpreting the ignition analyzer
Diagnosing ignition system problems

Repairing the heater controls
Removing, repairing & replacing the heater core
Diagnosing engine heating & cooling system problems

Automotive Braking System
Identifying brake system components
Adjusting brakes
Removing & rebuilding brake cylinders
Removing & rebuilding brake calipers
Replacing brake shoes & pads
Machining brake drums
Machining brake rotors
Replacing hydraulic control valves & lines
Replacing power brake units
Diagnosing brake system problems

Automotive Suspension System
Identifying suspension system components
Inspecting suspension system components
Lubricating & adjusting front wheel bearings
Replacing shock absorbers
Replacing front coil springs & rear leaf springs
Changing & balancing wheels & tires
Replacing upper & lower control arms & bushings
Replacing upper & lower ball joints
Replacing king pins & bushings
Replacing torsion bars
Replacing twin I-beams
Diagnosing suspension system problems

Removing & inspecting the valves & component parts
Refacing the valves & valve stems
Inspecting the cylinder head
Grinding the valve seats
Servicing the rocker arm, push rod & lifter assemblies
Reassembling & replacing the cylinder head(s)
Diagnosing problems in the valve train

Automotive Timing Chain Replacement
Removing component parts
Removing vibration damper
Removing front cover
Removing & replacing timing chain(s) and/or gears
Replacing front cover & seal
Diagnosing timing chain problems

Automotive Short Block
Removing engine from vehicle
Removing & inspecting useable parts
Assembling new & used parts on block assembly
Installing engine assembly
Testing engine assembly
Diagnosing internal engine problems
Disassembling engine
Cleaning & inspecting block & components
Preparing cylinder block
Installing cam bearings
Installing piston pins & rings
Installing crankshaft

Testing and repairing the horn circuit
Testing and repairing the windshield
Testing and repairing the windshield washer circuits
Testing and replacing instrument gauges and sending units

Automotive Electrical Accessories
Testing and repairing the cruise control unit
Testing and repairing the automatic alarm system
Testing and repairing the C.B. radio power circuit
Testing and trimming the radio antenna
Testing and repairing power windows and seats
Testing and repairing fog lights

Automotive Air Conditioning
Testing system performance
Discharging the system
Evaluating and charging the system
Rebuilding compressors
Replacing refrigerant lines and accessories
Installing air conditioning units
Diagnosing air conditioning problems

Automotive Manual Transmission
Adjusting and repairing clutch & shift linkage
Removing and disassembling transmission
Inspecting and reassembling transmission
Removing and replacing clutch assembly
Removing and replacing flywheel ring gear
Diagnosing manual transmission problems

Automotive Starting System

Servicing battery & cables
Replacing & rebuilding solenoids & switches
Removing & replacing the starter
Disassembling & inspecting the starter components
Reconditioning the starter components
Reassembling & testing the starter
Diagnosing starting problems

Automotive Charging System

Testing the DC generator & regulator
Testing the alternator & regulator
Removing, disassembling & inspecting the generator
Rebuilding the generator
Removing & replacing generators & alternators
Diagnosing charging system problems

Automotive Heating & Cooling System

Checking coolant level & freezing point
Cleaning & flushing the system
Inspecting, adjusting or replacing fan belts & hoses
Testing system with pressure
Removing, repairing & replacing the radiator
Testing & replacing thermostats & radiator caps
Replacing the variable speed fan
Replacing the water pump

Automotive Steering System

Identifying steering system components
Adjusting manual steering gear
Inspecting & replacing steering gear linkage
Replacing power steering unit
Replacing steering column
Aligning the front-end
Diagnosing steering system problems

Automotive Emissions Control and Exhaust Systems

Identifying emission control components
Measuring exhaust emissions
Testing & replacing components in the fuel evaporative control system
Testing & replacing components in the exhaust gas recirculation (EGR) system
Testing & replacing the catalytic converter
Testing & replacing components in the thermostatic air cleaner system
Testing & replacing components in the spark control system
Removing & replacing exhaust pipes, mufflers & tail pipes
Diagnosing emission control & exhaust system problems

Automotive Valve Job

Identifying component parts
Performing the cylinder compression & leakage test
Adjusting the valves
Removing the cylinder head(s)

Installing pistons & rod bearings
Installing oil pump, oil pan & component parts

Automotive Diesel Engine Overhaul

Comparing the automotive gas & diesel engines
Performing the cylinder compression leakage test
Removing & replacing fuel injectors
Removing & replacing the fuel injection pump
Removing & replacing the turbocharger
Removing the engine from the vehicle
Disassembling & inspecting the engine
Rebuilding the diesel engine
Installing the engine
Testing the engine
Diagnosing diesel engine problems

Automotive Electrical Circuits

Replacing wiring and making splices
Testing and maintaining electrical protection devices
Testing and repairing the courtesy light circuit
Testing and repairing the parking light circuit
Testing and repairing the back-up light circuit
Testing and repairing the head light circuit
Testing and repairing the turn signal circuit
Testing and repairing the brake light circuit

Automotive Drive Line and Rear End

Inspecting drive shaft
Removing and replacing universal joint
Removing and replacing constant velocity joints
Removing and replacing rear axle bearings
Removing and disassembling differential assembly
Inspecting and reassembling differential assembly
Removing and replacing front drive axle assembly
Rebuilding the four wheel drive locking hubs
Rebuilding the four weel drive transfer case
Diagnosing drive line and rear end problems

Automotive Automatic Transmissions

Testing the automatic transmission
Inspecting and adjusting shift linkage
Removing and replacing the transmission oil filter
Testing and replacing the vacuum modulator
Removing and disassembling transmission
Inspecting and reassembling transmission
Testing transmission on bench
Removing and replacing torque converter
Diagnosing automatic transmission problems

SECTION VIII

SPECIAL NEEDS STUDENT

WORKING WITH SPECIAL NEEDS STUDENTS

Introduction

Special needs students are those who are designated as handicapped and/or disadvantaged. The 1976 vocational education amendment defines handicapped individuals as:

> Persons who are mentally retarded, hard of hearing, deaf, speech impaired, visually handicapped, seriously emotionally disturbed, orthopedically impaired, health impaired, or persons with other specific disabilities, who by reason thereof require special education and related services and who cannot succeed in the regular vocational education programs.

In Title II of the 1976 education amendments disadvantaged persons are defined as:

> Persons (other than handicapped persons) who have academic or economic disadvantages and who require special services, assistance or programs in order to enable them to succeed in vocational education programs.

Federal legislation requires that these special people be given an opportunity to function in a regular classroom. This section provides information on how special needs students are identified and how they can be mainstreamed into regular educational environments.

Figure One presents a model depicting various activities of the process in identifying and mainstreaming special needs students. These activities are conducted at three levels: the system level, the school level and the classroom level. All three levels must work together if implementation of the process is to be effective.

Identification Of The Special Needs Student

Through a variety of pre-testing procedures, special needs students are identified and their potentials are evaluated at the

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SPECIAL NEEDS MAINSTREAMING MODEL

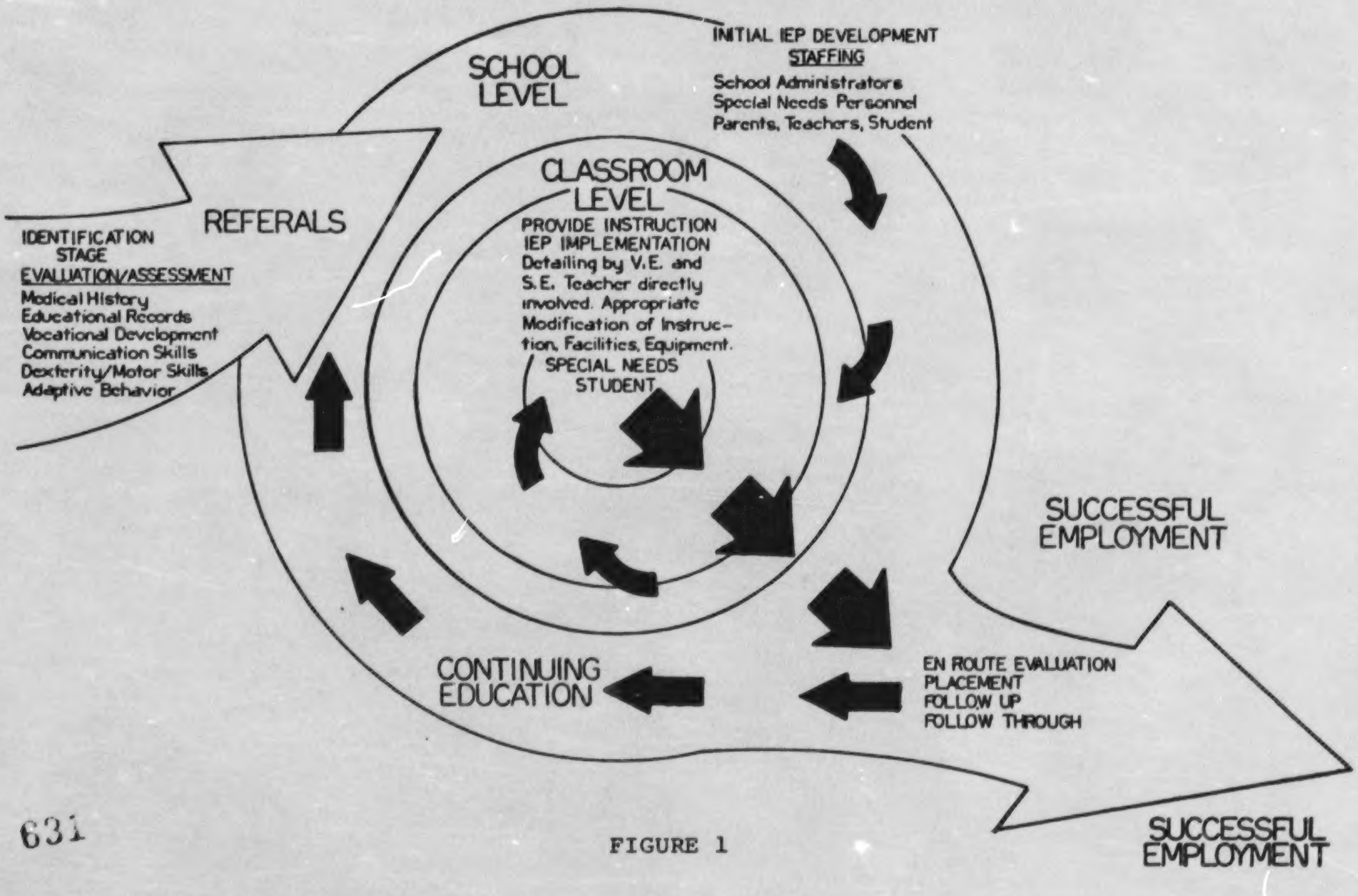
SCHOOL LEVEL
INITIAL IEP DEVELOPMENT
STAFFING
School Administrators
Special Needs Personnel
Parents, Teachers, Student
REFERALS
IDENTIFICATION STAGE
EVALUATION/ASSESSMENT
Medical History
Educational Records
Vocational Development
Communication Skills
Dexterity/Motor Skills
Adaptive Behavior
CLASSROOM LEVEL
PROVIDE INSTRUCTION
IEP IMPLEMENTATION
Detailing by V.E. and S.E. Teacher directly involved. Appropriate Modification of Instruction, Facilities, Equipment.
SPECIAL NEEDS STUDENT
SUCCESSFUL EMPLOYMENT
EN ROUTE EVALUATION
PLACEMENT
FOLLOW UP
FOLLOW THROUGH
CONTINUING EDUCATION
SUCCESSFUL EMPLOYMENT

FIGURE 1

system level. This evaluation process consists of collecting and assessing the following data for each student:

-Medical History
-Educational Records
-Vocational Development
-Communication Skills
-Dexterity/Motor Skills
-Adaptive Behavior

When this procedure has been completed, the system personnel refers the student to the appropriate school level personnel.

Development of the Plan

At the school level, an Individual Education Plan (IEP) is developed for each special needs student. An IEP is a written plan which describes the educational objectives, both long and short term, and the support services for a special needs student. The plan is developed by the school administration, special education personnel, teacher(s) directly involved with the student and the parent(s). In some cases, the student may help with the development.

Implementing the I.E.P.

The actual implementing of the I.E.P. begins at the classroom level. The purpose of the teacher dealing with the special needs student is to help the student set realistic goals, identify the barriers which make it difficult for the student to learn and adapt the curriculum and/or facilities with reference to the I.E.P. so the student can learn while overcoming personal barriers.

Special needs students have problems which hinder their learning. Therefore, a teacher's job becomes more complicated than when teaching "regular" students. Handicapped students may have a variety of problems - mental, physical and/or emotional.

Academically disadvantaged students may exhibit language deficiencies, reading and writing deficiencies, computational deficiencies and general educational deficiencies. Economically disadvantaged students may possess an inability to concentrate because their primary needs - food, shelter, clothing - are not adequately met due to lack of money.

By considering these problems, teachers can modify existing programs to accommodate the needs of special needs learners. Some suggestions which may prove beneficial in modifying an existing curriculum are listed below:

- -Prepare instructional materials in greater detail and assign work in shorter units.
- -Provide more frequent evaluation of student's progress and provide opportunities for remedial work.
- -Be aware of the student's limited vocabulary.
- -Be aware of the student's inability to understand abstractions and generalizations and prepare materials accordingly.
- -Keep the student aware of his or her progress and make the student feel he or she can succeed.
- -Use real teaching aids, live work and practical experiences whenever possible.
- -Choose reading material which is at the student's level, interest and experience.
- -Use constructive criticism only.
- -Use peer instruction whenever possible.
- -Allow the student to advance at his or her own pace.
- -Use the part-to-whole learning concept in adapting materials.

Materials Which Can Be Used to Teach Disadvantaged

In Georgia an effective set of materials has been developed to be used with a program to help disadvantaged students adjust to life and work situations. This program is called CVAE or Coordinated Vocational Academic Education. The CVAE program is organized with a coordinator who is responsible for the type of instruction the students receive, and a team of teachers assigned to the coordinator who work cooperatively to help the disadvantaged students learn to enjoy school and become more successful students. CVAE materials include visuals in the form of synchronized slide/ tape presentations. These units are designed to help the disadvantaged student become more successful in school, learn good work habits, become an aware consumer, and develop a better self-image and appearance. (Although designed especially for disadvantaged students, CVAE may also be used in regular classroom situations). The vocational education teacher should work with the CVAE coordinator to design a program of study for the disadvantaged students in areas in which the student needs help.

In some cases, facilities, must be modified for handicapped special needs students. In general, as long as the classroom/ shop meets federal guidelines for barrier free design, extensive facility changes need not be made. For visually impaired students, for example, let the student locate in the classroom where he or she can see best even to the point of moving the desk or work station as a portable unit. In the case of orthopedically handicapped, some changes may have to be made to shop machinery to allow the student to use it. This may involve more convenient controls or special seating where the student would normally stand. In making these changes, special education expertise would be helpful.

Evaluation

Evaluation of the student's program should consist of:

- En-route evaluation (formative) to monitor the student's progress through the program.
- Summative evaluation upon completion of the program to determine job readiness.
- Follow-up after placement to determine if the student is successful on the job.
- Follow-through activities designed to identify any further training needed, which is indicated by the follow-up procedure.

Working with special needs students is much more demanding of the system, the school and the classroom teacher. However, with their patience and understanding, special needs students can not only succeed, but in many cases excell.

RESOURCES

To aid the teacher in modifying materials for special needs categories, the following references are listed by category. These are suggested references only as a world of materials exist on this subject.

Mentally Retarded

A Curriculum Guide for Teachers of Educable Mentally Retarded. Danville, Ill.: The Interstate Printers and Publishing Co., Inc.

High, Elizabeth C., and Moyers, Kathy L. Training Manual: Developing Pre-Vocational/Vocational Skills in Developmentally Disabled Persons. Washington, D.C.: Job Development Laboratory, George Washington University, 1976.

Kolstoe, Oliver P. Teaching Educable Mentally Retarded Children. Holt, Rinehart and Winston, 1976.

Mulligan, Robert E.; Gavin, Donald and Conaley, James. Comprehensive Career Education Curriculum Guide for the Trainable. New Brunswick, N.J.: Rutgers Vocational-Technical Curriculum Laboratory, 1977.

Introduction to Vocations for Educable Mentally Retarded. New Jersey: New Jersey Department of Education.

State of Ohio Curriculum Guide for Moderately Retarded Learners. Columbus, Ohio: Ohio Department of Education, 1977.

Tucker, Mark M. Learning through Curriculum Modification; A Blueprint to Teaching the Mentally Retarded. Johnstown, PA.: Mafex Associates, Inc., 1976.

Watson, Marjorie. Mainstreaming the Educable Mentally Retarded. Washington, D.C., NEA, 1975.

Hearing Impaired

Alvin, Howard P. The Evolution of an Evaluation Design for Evaluating Secondary Programs for the Deaf in Vocational Occupational-Technical Education (VOTE) Programs. ERIC - ED 123-241.

Guidelines: Educational Planning for the Hearing Handicapped. North Carolina Public Schools. Division for Exceptional Children, North Carolina Department of Public Instruction, Raleigh, N.C., 1977.

Munson, Harold L.; Eglston, Judy Cobb and Phillips, Gordon B. Career Education for Deaf Students: An Inservice Leader's Guide. University of Rochester, College of Education, Center for the Study of Helping Services, Rochester, N.Y. 1975.

Nix, Gary W. Mainstreaming Education for Hearing Impaired Children and Youth. Grune and Stratton, 1976.

Orthopedically and Other Health

A Model Plan for a Cooperative Vocational Rehabilitation Program. Office of Human Development, Rehabilitation Services and Administration. Department of Health, Education and Welfare, Washington, D.C.

Mallix, Kalisanker and Mueller, Jim. Vocational Aids and Enhanced Productivity of the Severely Disabled. The George Washington University Rehabilitation Research and Training Center, Washington, D.C. 1975.

McCarthy, Henry and Smart, Landon. Recommendations for Enhancing Employment Prospects of Handicapped Individuals. Comps. Human Resources Center, Albertson, L. I., 1978.

Duncan, John, et al. Environmental Modifications for the Visually Impaired: A Handbook. Visual Impairment and Blindness, December 1977, p. 442-455.

Disadvantaged

Guidelines for Methods and Techniques of Teaching Disadvantaged Students. Division of Vocational Education, Virginia Polytechnic Institute and State University, Blackburg, VA.

A Handbook for Developing Programs and Services for Disadvantaged Students. Department of Vocational Education Studies, College of Education, Southern Illinois, University of Carbondale, Carbondale, Ill. 62901

By Program

Adaption of Home Economics Curricula for Special Needs. North Dakota Research Coordination Unit, State Board for Vocational Education, State Office Building, Bismarck, ND.

Auto Body: An Adaptive and Developmental Program for Special Needs Students. Vocational-Technical Curriculum Laboratory, Rutgers - The State University, New Brunswick, N.J. 1976.

Floriculture Board of Cooperative Educational Services of Nassaw County, Division of Occupational Education, Division of Special Education, Westburg, NY 1975.

Grubb, Francine. Basic Business - A Teacher's Guide to an Employment Orientation Course for Special Needs Students. Vocational Technical Curriculum Laboratory, Rutgers - The State University, New Brunswick, N.J. 1976.

Home Economics and the Exceptional Student: A Handbook for Home Economics Teachers Working with Mentally Retarded Students. Vocational-Technical Curriculum Laboratory, Rutgers - The State University, New Brunswick, N.J. 1976.

Troutman, Carol M. Introduction to Office Occupations. Vocational-Technical Curriculum Laboratory, Rutgers - The State University, New Brunswick, N.J. 1974.

Working with the Handicapped in the Vocational Home Economics Classroom. Division of Vocational Education, State of Ohio, Columbus, Ohio.

Coordinated Vocational Education and Training (C.V.E.T.) manuals for disadvantaged, available from: Oklahoma State Department of Vocational and Technical Education, Curriculum and Instructional Materials Center, 1515 West Sixth Avenue, Stillwater, Oklahoma 74074.

-CVET Construction	3100219	Teacher's Guide
	3100209	Student
-CVET General Mechanics	3100239	Teacher's Guide
	3100229	Student

General Special Needs

A Handbook for Modifying Vocational Curricula for Handicapped Students. Wisconsin Vocational Studies Center, University of Wisconsin, Madison, May 1980.

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SECTION IX

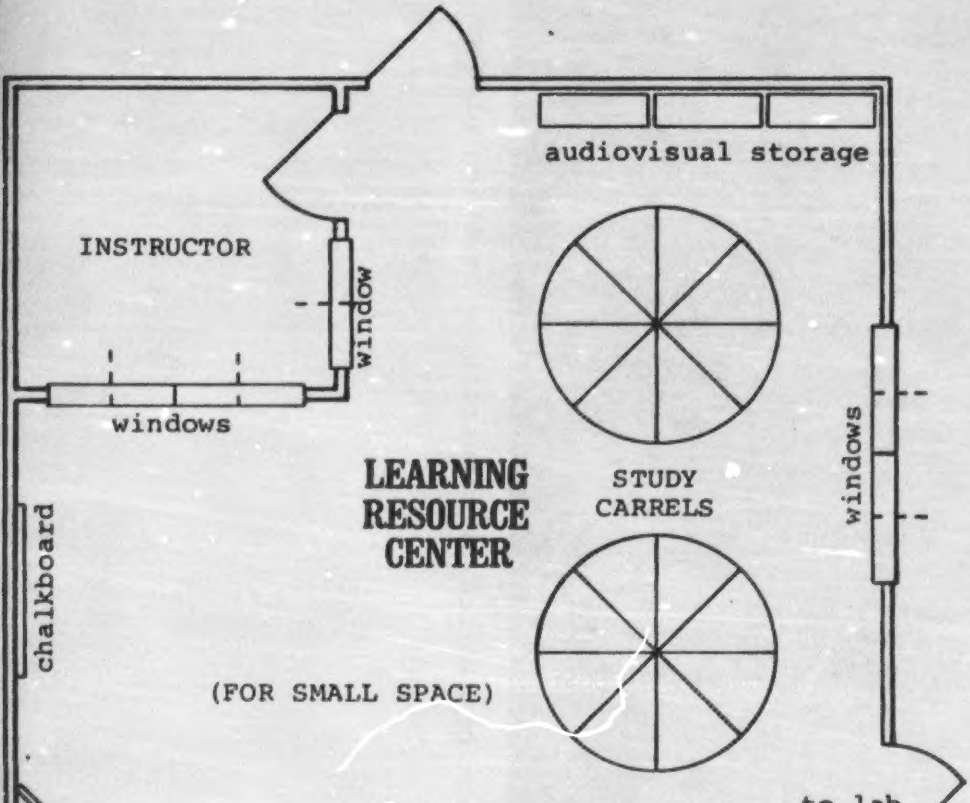
FACILITY LAYOUT

Facility Layout

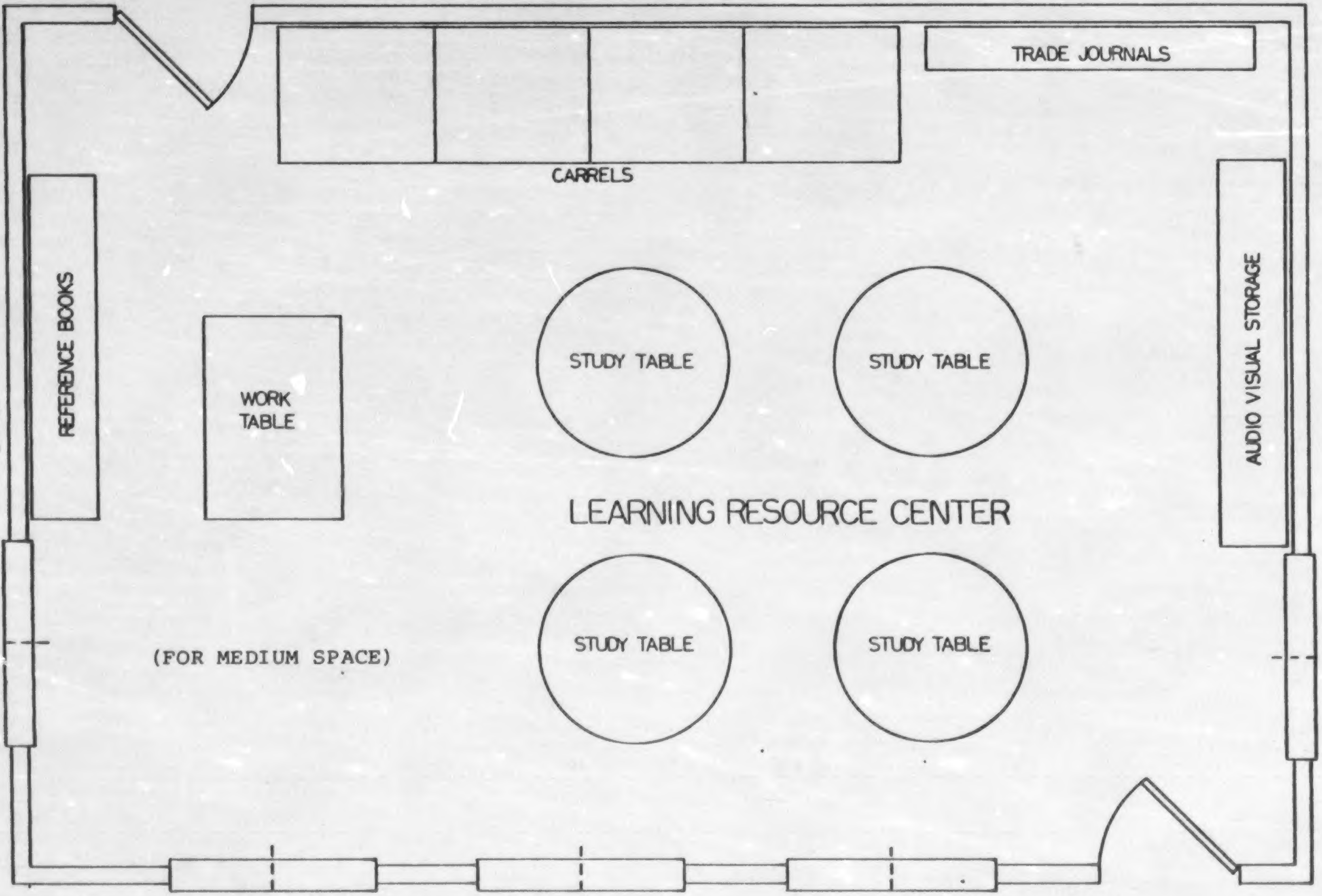
The facility layouts on the following pages are presented to aid in arranging the classroom and laboratory for efficient instruction. The three resource center arrangements represent small, medium and large centers. Ultimately, the instructor must determine an arrangement that best fits the needs of the students and the instructional method being used.

The laboratory facility layout is one recommended by the teachers who helped develop the Auto Mechanics program materials. This facility is easily adaptable to a variety of arrangements that will best fit local needs.

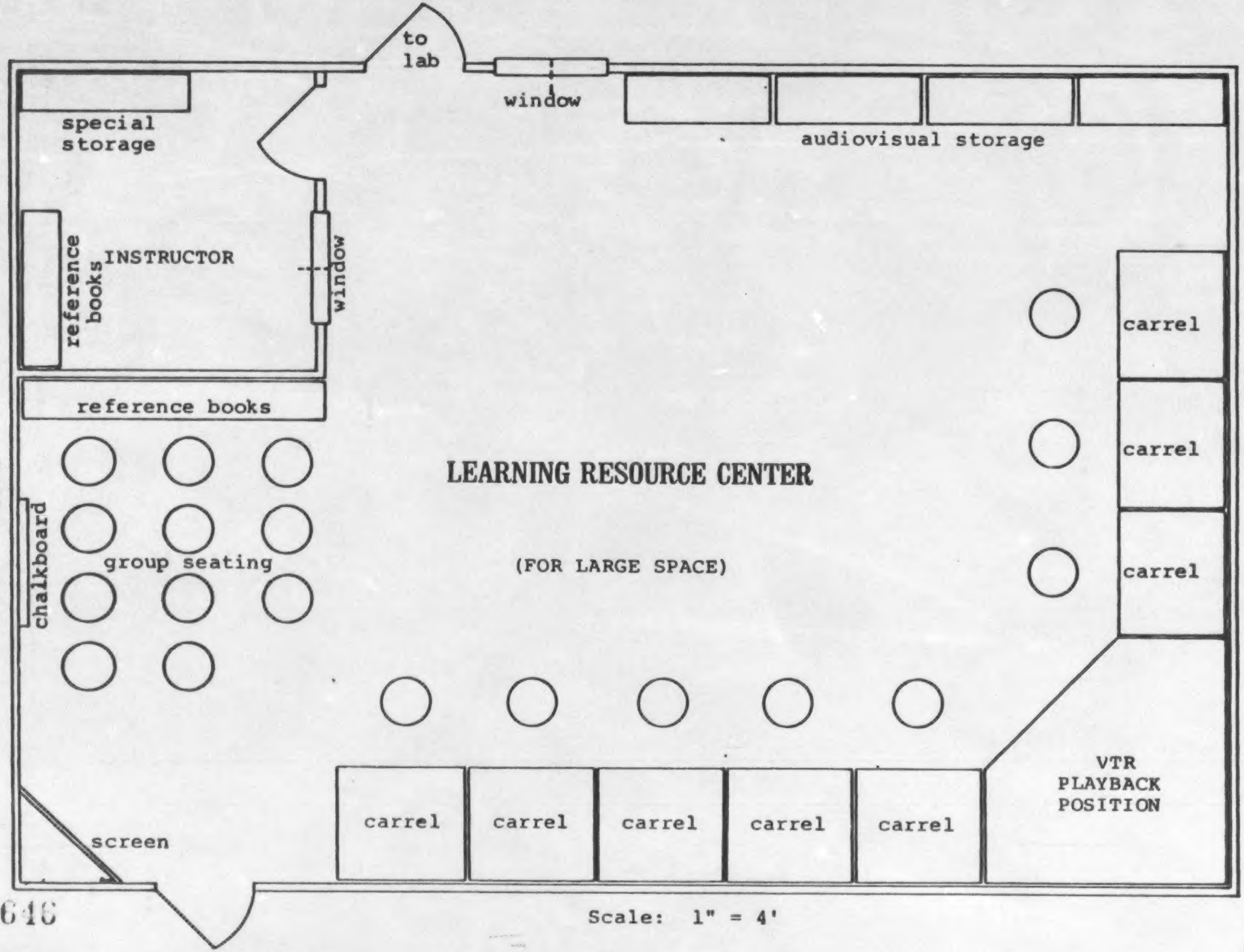
These layouts may be especially useful in those schools where classroom renovation or construction is being planned.


audiovisual storage
INSTRUCTOR
window
windows
LEARNING RESOURCE CENTER
STUDY CARRELS
windows
chalkboard
(FOR SMALL SPACE)
to lab
screen
reference materials and periodicals

Scale: 1" = 4'

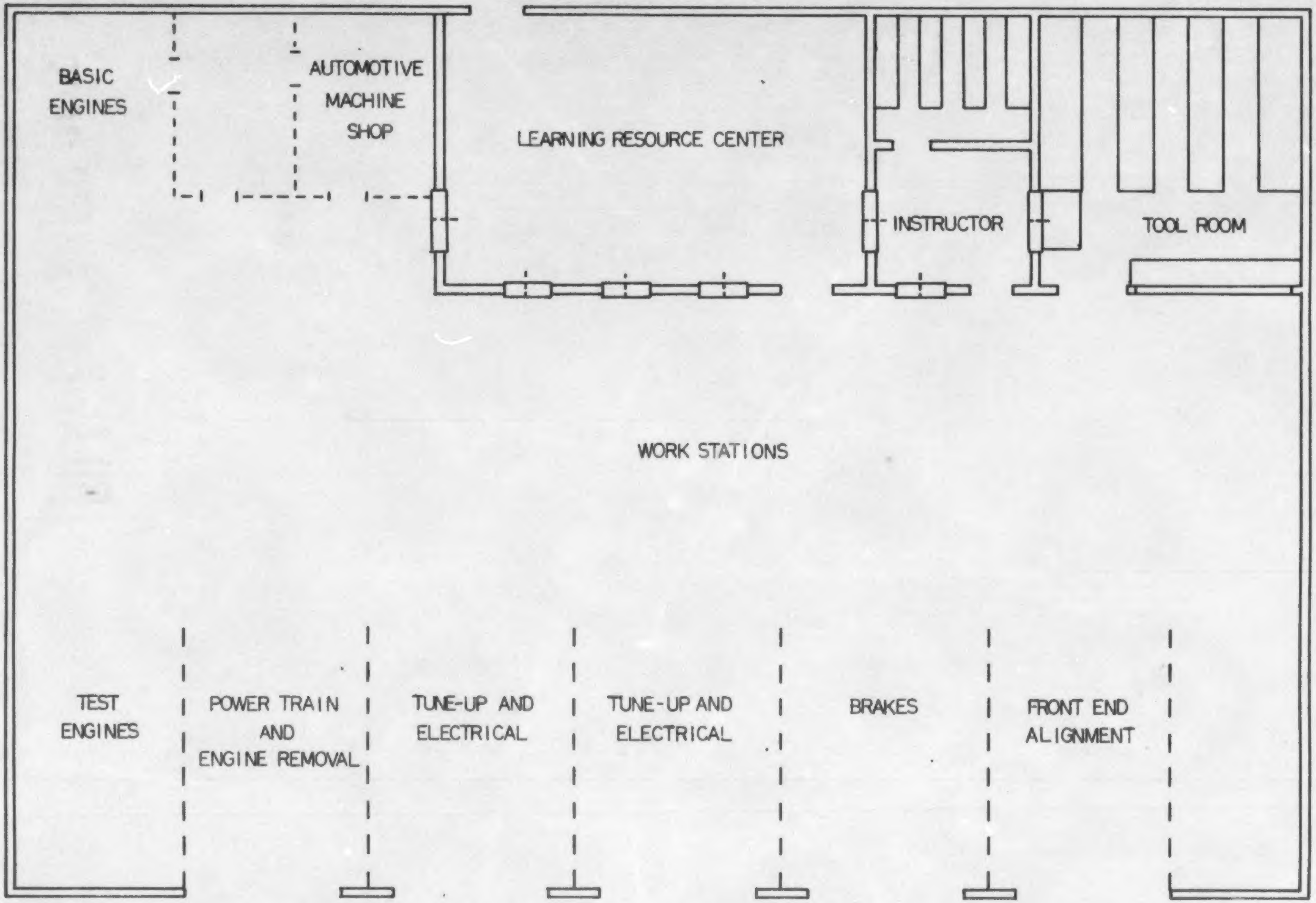

TRADE JOURNALS
CARRELS
REFERENCE BOOKS
WORK TABLE
STUDY TABLE
STUDY TABLE
LEARNING RESOURCE CENTER
STUDY TABLE
STUDY TABLE
AUDIO VISUAL STORAGE

(FOR MEDIUM SPACE)


to
lab
window
special
storage
audiovisual storage
reference
books
INSTRUCTOR
window
reference books
LEARNING RESOURCE CENTER
(FOR LARGE SPACE)
carrel
carrel
carrel
chalkboard
group seating
screen
carrel
carrel
carrel
carrel
carrel
VTR
PLAYBACK
POSITION

Scale: 1" = 4'

AUTO MECHANICS LABORATORY


BASIC ENGINES
AUTOMOTIVE MACHINE SHOP
LEARNING RESOURCE CENTER
INSTRUCTOR
TOOL ROOM
WORK STATIONS
TEST ENGINES
POWER TRAIN AND ENGINE REMOVAL
TUNE-UP AND ELECTRICAL
TUNE-UP AND ELECTRICAL
BRAKES
FRONT END ALIGNMENT

SECTION X

DEFINITION OF TERMS

DEFINITION OF TERMS

1. AV's-Audiovisuals - May refer to any picture and/or sound media. (ie. slides, tapes, filmstrips, 16 mm films, etc.)

2. Checkpoint - A student-instructor interface point wherein the instructor may give the student a test, perform a demonstration, or simply provide the student with additional needed information or instructions. Also a checkpoint may be used for motivational purposes.

3. Competency - The ability (knowledge, skills and attitudes) to perform all of a group or cluster of related tasks required to complete a designated activity according to occupational standards. In the educational setting the statement of a competency includes expected student outcomes in terms of knowledge, skills, and attitudes required to complete a designated activity as defined by incumbent workers according to the standards of the work place.

4. Course - A grouping of tasks and competencies which have a common knowledge base or are within a given domain.

5. Criterion-Referenced Measure - An exercise based upon a performance objective, the accomplishment of which measures attainment of that objective.

6. Criterion-Referenced Test - A test designed to measure student competencies based on job or industrial standards.

7. Curriculum Guide - A document containing the objectives, content, organization, and structure of an instructional program. It is designed for use by administrators, instructional supervisors and teachers.

8. D.O.T. - Abbreviation for Dictionary of Occupational Titles. Document provides nine digit codes identifying each occupation.

9. Duty - One of the distinct major activities involved in the work performed, comprising related tasks.

10. Exit Point - A predetermined point within an instructional program in which a student may exit with the essential competencies for a specific job. Usually defined in terms of D.O.T. codes and/or O.E. codes.

11. "Hands-On" - Statement implying the student is physically involved in a learning activity.

12. Individualized Instruction (I.I.) - A system of instruction allowing for a student to progress at their fastest rate.

13. Job - A specific area of specialization within an occupational field consisting of several closely related duties for which a person would expect to receive remuneration. Should be identified by DOT code.

14. Job Sheet - (Or Operations Sheet) - A project of a performance nature. Generally performed by the student in a lab or shop type environment or in a specialized work area.

15. Live Work - Generally refers to items brought into the course area for repair or adjustment. Examples of live work might be automobiles, radios and TV's, air-conditioners, etc. Another form of live work would be patrons visiting the cosmetology department to receive permanents or other services.

16. Master Copies - Original copies of slides, tapes or written materials set aside for the purpose of duplication.

17. Occupational Cluster - A group of occupations sharing a common core of competencies. Georgia's comprehensive high school vocational program is organized around this concept.

18. Occupational Inventory - A listing of tasks to be performed in a particular occupational area, grouped under duty classifications.

19. O.E. - Refers to the U. S. Office of Education. O.E. codes are a classification system (taxonomy) for occupational education programs.

20. Open Entry - Term meaning that a student may enter the program at any time and does not have to wait for quarter or semester breaks.

21. Open Exit - Term meaning that a student may leave a program any time he/she completes their occupational objective.

22. Performance Guide - A series of steps, arranged in a sequence ordinarily followed, which when completed may result in the performance of a task. Also called "teaching steps."

23. Performance Objective - A statement in precise, measurable terms of a particular behavior to be exhibited by a learner under specified conditions. It possesses each of the elements or characteristics specified below:

    a. Condition - The testing situation confronting the learner is clearly specified. This includes equipment provided or withheld, environmental constraints such as temperature, space, etc.

b. Performance - The specific behavior expected of the learner is stated.

c. Standard - The degree of acceptable performance is specified.

24. Performance Test - A test entailing not only the ability to answer questions, but measuring the students' ability to operate, manipulate, or perform a given task as well.

25. Program - An organized sequence of courses leading to an occupational objective. A program may contain one or more student exit points as defined by D.O.T. codes.

26. Program Objective - The outcome of a prescribed program of instruction. Usually expressed in terms of the occupation or job for which training is designed. D.O.T. codes are frequently used to identify program objectives or student exit points.

27. Self-Paced - Refers to a student moving through the prescribed training program at the fastest pace at which the student can meaningfully learn.

28. Sequencing - Putting any set or series of learning activities or tasks into proper order or sequence. Normally arranged from the simple to complex within groupings or blocks.

29. Software - Written or printed materials, slides, filmstrips, tapes, etc.

30. Student Manual - A document designed for use by students in a specific instructional program. It contains unit sheets, references, operational procedures or job sheets, etc.

31. Task - The smallest division of work in which a measurable output occurs. A logical and necessary step in the performance of a duty.

32. Task List - A listing of tasks performed by incumbent workers within a domain of interest. An example is a listing of all tasks performed by an automotive mechanic or by a worker in ornamental horticulture.

33. Unit - One "module" training materials; generally covering one learning task and programmed on one Unit Sheet. May cover more than one lesson.

34. Unit Guide - A curriculum guide sheet that lists a task and objective with the instructional activities, instructional materials, evaluation and approximate time required for a student to successfully complete the task.

35. V-TECS Catalog - A comprehensive collection of performance objectives, performance guides, criterion-referenced measures, and related data, organized by a job structure or career ladder within a domain of interest.

Federal law prohibits discrimination on the basis of race, color or national origin (Title VI of the Civil Rights Act of 1964); sex (Title IX of the Educational Amendments of 1972 and Title II of the Vocational Education Amendments of 1976); or handicap (Section 504 of the Rehabilitation Act of 1973) in educational programs or activities receiving federal financial assistance.

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The following individuals have been designated as the employees responsible for coordinating the department's effort to implement this nondiscriminatory policy.

Title II - Loydia Webber, Vocational Equity Coordinator
Title VI - Peyton Williams Jr., Associate Superintendent
of State Schools and Special Services
Title IX - Evelyn Rowe and Myra Tolbert, Coordinators
Section 504 - Jane Lee, Coordinator of Special Education

Inquiries concerning the application of Title II, Title VI, Title IX or Section 504 to the policies and practices of the department may be addressed to the persons listed above at the Georgia Department of Education, State Office Building, Atlanta 30334; to the Regional Office for Civil Rights, Atlanta 30323; or to the Director, Office for Civil Rights, Education Department, Washington, D.C. 20201.